

# UNDERGRADUATE STUDY

UNIVERSITY OF ILLINOIS AT CHICAGO CIRCLE 1970-1971

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1970/71

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JUL 1 1969

**The University of Illinois  
at  
Chicago Circle**

**Undergraduate Study**

This publication is a record of the 1969-1970 academic year  
and an announcement of the 1970-1971 academic year.



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# Academic Calendar

## 1970-1971

### *Chicago Circle*

#### **Fall Quarter**

September 21-25, M-F  
September 28, M  
November 26-27, Th, F  
December 4, F  
December 7-11, M-F

Registration week  
Instruction begins  
Thanksgiving vacation  
Instruction ends  
Final examinations

#### **Winter Quarter**

December 14-18, M-F  
January 4, M  
March 12, F  
March 15-19, M-F

Registration week  
Instruction begins  
Instruction ends  
Final examinations

#### **Spring Quarter**

March 22-26, M-F  
March 29, M  
May 14, F  
May 30, Sun  
June 4, F  
June 7-11, M-F  
June 21, Sun

Registration week  
Instruction begins  
Honors Day  
Memorial Day  
Instruction ends  
Final examinations  
Commencement

#### **Summer Quarter**

June 14-18, M-F  
June 21, M  
July 4, Sun  
August 27, F  
August 30-September 3, M-F

Registration week  
Instruction begins  
Independence Day  
Instruction ends  
Final examinations

## *Urbana*

### **First Semester**

September 8-14, Tu-M  
September 10-12, Th-Sat (noon)  
September 14, M  
November 25, W, 1 p.m.  
December 1, Tu, 1 p.m.  
December 19, Sat, 1 p.m.  
January 4, M, 1 p.m.  
January 16, Sat  
January 18-26, M-Tu

New Student Program  
Registration  
Instruction begins  
Thanksgiving vacation begins  
Thanksgiving vacation ends  
Christmas vacation begins  
Christmas vacation ends  
Last day of instruction  
Semester examinations

### **Second Semester**

February 1-8, M-Tu  
February 4-6, Th-Sat (noon)  
February 8, M  
April 3, Sat, 1 p.m.  
April 12, M, 1 p.m.  
April 30, F  
May 29, Sat  
May 31, M  
June 1-9, Tu-W  
June 19, Sat

New Student Program  
Registration  
Instruction begins  
Spring vacation begins  
Spring vacation ends  
Honors Day  
Last day of instruction  
Memorial Day (holiday)  
Semester examinations  
Commencement

### **Eight-Week Summer Session**

June 21, M  
June 22, Tu  
July 5, M  
July 19, M  
August 12, Th  
August 13, 14, F, Sat

Registration  
Instruction begins  
Independence Day (holiday)  
Beginning of second four-week courses  
Last day of instruction  
Summer session examinations

## 1971-1972

### *Chicago Circle*

#### **Fall Quarter**

September 20-24, M-F  
September 27, M  
November 25-26, Th, F  
December 3, F  
December 6-10, M-F

Registration week  
Instruction begins  
Thanksgiving vacation  
Instruction ends  
Final examinations

#### **Winter Quarter**

December 13-17, M-F  
January 3, M  
March 10, F  
March 13-17, M-F

Registration week  
Instruction begins  
Instruction ends  
Final examinations

#### **Spring Quarter**

March 20-24, M-F  
March 27, M  
May 12, F  
May 29, M  
May 30, Tu  
June 2, F  
June 5-9, M-F  
June 18, Sun

Registration week  
Instruction begins  
Honors Day  
Memorial Day holiday (no classes)  
Memorial Day (classes will be held)  
Instruction ends  
Final examinations  
Commencement

#### **Summer Quarter**

June 12-16, M-F  
June 19, M  
July 4, Tu  
August 25, F  
August 28-September 1, M-F

Registration week  
Instruction begins  
Independence Day (no classes)  
Instruction ends  
Final examinations

## *Urbana*

### **First Semester**

September 7-12, Tu-Sun  
September 9-11, Th-Sat (noon)  
September 13, M  
November 24, W, 1 p.m.  
November 30, Tu, 1 p.m.  
December 18, Sat, 1 p.m.  
January 3, M, 1 p.m.  
January 15, Sat  
January 17-25, M-Tu

New Student Program  
Registration  
Instruction begins  
Thanksgiving vacation begins  
Thanksgiving vacation ends  
Christmas vacation begins  
Christmas vacation ends  
Last day of instruction  
Semester examinations

### **Second Semester**

January 31-February 6, M-Sun  
February 3-5, Th-Sat (noon)  
February 7, M  
March 25, Sat, 1 p.m.  
April 3, M, 1 p.m.  
May 12, F  
May 27, Sat  
May 29, M  
May 30-June 7, Tu-W  
June 10, Sat

New Student Program  
Registration  
Instruction begins  
Spring vacation begins  
Spring vacation ends  
Honors Day  
Last day of instruction  
Memorial Day (holiday)  
Semester examinations  
Commencement

### **Eight-Week Summer Session**

June 16-17, F, Sat  
June 19, M  
July 4, T  
July 17, M  
August 10, Th  
August 11-12, F, Sat

Registration  
Instruction begins  
Independence Day (holiday)  
Beginning of second four-week courses  
Last day of instruction  
Summer session examinations





# The Board of Trustees

## of the University of Illinois

### Members Ex Officio

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#### *1967-1973*

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Director, University Honors Programs.....	ROBERT E. JOHNSON
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Director, Physical Plant Planning and Construction; Plant Services.....	VERNON L. KRETSCHMER



# Perspective

The University of Illinois at Chicago Circle was activated on February 22, 1965, not as a new institution but as the successor to the Chicago Undergraduate Division, through which the University of Illinois for 19 years provided the first two years of college and preprofessional work for over 100,000 college-commuting students of the Chicago area.

In the spring of 1946 the University knew that men and women from the Armed Services would inundate the Urbana-Champaign campus. It was impossible to construct additional facilities in time to meet the demand, and restricting enrollment was undesirable. Therefore, Navy Pier, already used as a school and adaptable to the needs of a freshman-sophomore program, was leased by the Board of Trustees, and the Chicago Undergraduate Division was organized. That fall, 3800 students, three-fourths of them veterans, were enrolled and attended classes of reasonable size taught by competent faculty in quarters at least minimally satisfactory. Without the Chicago Undergraduate Division there would have been no place for most of them to go.

Although the percentage of veterans dropped slightly in 1947, enrollment rose above 4500, for as the wave of veterans moved through the freshman and sophomore years, their places were taken by their nonveteran brothers and sisters.

As the years passed, the need for a four-year campus in Chicago was increasingly evident. In January, 1961, the Board of Trustees approved the granting of baccalaureate degrees by the Chicago Undergraduate Division as soon as an adequate campus was available. The site, where the Eisenhower, Ryan, and Kennedy Expressways converge, was selected in 1961, the Chicago Undergraduate Division became the University of Illinois at Chicago Circle, and the campus was occupied on February 22, 1965.

Work for the baccalaureate is offered in the Colleges of Architecture and Art, Business Administration, Education, Engineering, Liberal Arts and Sciences, including secondary school programs in teacher education, and the School of Physical Education. The College of Education offers degrees in elementary education; secondary school programs in teacher education are offered within the College of Liberal Arts and Sciences.

Graduate work at either or both the master's and doctoral levels is offered in seventeen disciplines, which are covered in *Graduate Study*, the catalog of the Graduate College.



*The Chicago Circle Campus* is located just south and west of the Loop in an area bounded by the Eisenhower and Ryan Expressways, Racine Avenue, and Roosevelt Road. The mailing address is Box 4348, Chicago 60680. Transportation to the campus is by way of the Congress and Douglas Park trains of the CTA, which has built a subway station at Peoria Street especially to serve Chicago Circle, and by the buses on Halsted, Harrison, and Taylor Streets and on Roosevelt Road.

*Financial Aid* is available in the form of scholarships, loans, and part-time employment. In addition, each student who attends the University is the recipient of a type of scholarship represented by the educational subsidy provided by the General Assembly from tax funds. This large contribution toward the costs of instruction and facilities makes possible the greatly reduced charges for tuition and fees.

*The Student Activities Program* is carried out by many student organizations. Extracurricular activities are recognized as an important part of campus life and are encouraged as part of the broad education of the student. These groups sponsor varied activities for the benefit of their memberships and plan programs for the entire student body.

*The Athletic Program* consists of fourteen varsity sports—football, basketball, baseball, cross-country, fencing, ice hockey, track, wrestling, volleyball, swimming, soccer, gymnastics, tennis, and golf. This institution is a member of the National Collegiate Athletic Association and under a new ruling freshman students may participate in intercollegiate athletics. An extensive intramural sports program, for both men and women, centered on more than eighteen activities, serves over 5,000 students each year. The Women's Athletic Association and Orchesis offer sports activities and dance programs for women students.

*Housing.* The University of Illinois at Chicago Circle was established to serve the needs of students who can travel daily to and from the campus. It is assumed that most students will be living at home with their families or, if minors, in accommodations of which their parents would approve. There are many facilities in the Chicago area that offer activities and supervision similar to those of a residence hall, for example, the Eleanor Clubs (for women), the YWCA, and the YMCA. Whether students live in these facilities or in others is a matter of personal responsibility and/or of agreement between students and their parents.

*The Auxiliary Services Office* of the University of Illinois at Chicago Circle assists faculty, staff, and students in finding housing by maintaining a file of available rooms and apartments for rent and houses for rent or sale. This listing service is available Monday through Friday, from 8:30 a.m. to 4:45 p.m. in Room 704 of the Chicago Circle Center, Ext. 663-5058. Landlords are responsible only for a pledge of nondiscrimination on the

grounds of race, religion, or national origin. A listing is removed when there is evidence that the pledge has been violated. However, the University does not inspect the premises nor verify the accuracy of the statements made by the owners at the time of the referral.

*Cars* are used by the students as personal requirements permit. Parking lots at the University are self-sustaining and self-liquidating; hence, there are no free lots. Fees for parking are 50 cents each time a vehicle is parked; parking fees for the quarter are \$15 for students, faculty, and staff. (These fees are subject to periodic review and change.)

*Night Classes* are not held.

*The Division of University Extension* conducts and sponsors a number of educational programs for adult students not in residential programs. The facilities at Chicago Circle are used for extension programs including: *Extramural classes* in upper division and graduate courses; both credit and noncredit courses are available. Call 663-8560 or 663-2623 for further information.

*Correspondence courses* for undergraduate credit only. Write the Division of University Extension, University of Illinois, Urbana, Illinois 61801 for further information.

*Professional development courses* in social work offered in cooperation with the Jane Addams Graduate School of Social Work. Call 663-7096 for further information.

*Short courses and conferences* offered in a variety of subject-matter areas. Call 663-7729 for further information.

*Correspondence and Extramural Study.* Credit for correspondence courses taken through the University of Illinois and other fully accredited institutions may be allowed, but only on approval of the dean of the college concerned. After matriculation a student may, with the approval of the dean of his college, count toward his degree as many as 90 quarter hours of credit earned in extramural courses and/or correspondence study, under the following conditions:

1. If he completes all the remaining requirements for the degree in residence at the University, or
2. If he presents acceptable residence credit for work done elsewhere and completes the requirements needed for his degree in residence at the University. In all such cases he must be in residence for the senior year (three quarters of not less than 45 quarter hours).
3. University of Illinois correspondence and extramural courses are not counted toward satisfying the minimum residence requirements for the degree nor are they considered as interrupting University residence.
4. A resident student enrolled for courses must obtain approval of the dean of his college to enroll concurrently in correspondence courses.
5. A student is not permitted to register in more than three correspondence courses at one time.

6. A student who has been dropped from the University of Illinois for poor scholarship must obtain the recommendation of the dean of his college before completing his application for admission to correspondence work and before completing registration for an extramural course. A student dropped from another collegiate institution is considered for admission to correspondence study only on recommendation of the proper authorities of the institution from which he was dropped.

A student who has completed his first years in residence at the University and has earned a minimum of 135 quarter hours may do all or part of his senior year in extramural or correspondence study or in attendance at another accredited college or university if he meets all of the college requirements for a degree.

*Registration as a Visitor.* The privilege of attending classes as a visitor is granted on and after the first day of instruction and only by the instructor of the class with the approval of the dean of the college concerned. Registration forms may be obtained from the Records Counter of the Office of Admissions and Records. Visitors are not permitted in laboratory, military, or physical education classes.

A visitor is not allowed to write an examination (including a proficiency examination) for course credit nor to participate in class activities.

A registered student on a full-fee schedule or a person who is a permanent, nonacademic employee of the University does not pay a visitor fee. See *Fees*.

*Other University of Illinois Facilities* in Chicago include the College of Medicine (including the School of Associated Medical Sciences), Dentistry, Nursing, and Pharmacy and the Health Sciences Division of the Graduate College which are located in the West Side Medical Center.

Information may be obtained from the University of Illinois at the Medical Center, 1853 W. Polk Street, Chicago, Illinois 60612, or by calling 663-7000.

## The Library

WILLIAM B. ERNST, JR., A.M., Director of the Library  
 GILES B. ROBERTSON, A.M.L.S., Head, Public Services Division  
 LOUIS A. SCHULTHEISS, M.A., Head, Technical Services Division  
 GLENN R. SCHARFENORTH, M.A.L.S., Assistant to the Director

### Professors

William B. Ernst, Jr., M.A.; Giles B. Robertson, M.A.L.S.; Louis A. Schultheiss, M.A.

### Associate Professors

Marie A. Rapp, B.A.L.S.; Arnold S. Wajenberg, M.A.L.S.

### Assistant Professors

Robert J. Adelsperger, M.S.; Aivars Aistars, M.A.; Harriet K. Barlow, M.S.; Marjorie Bengtson, M.S.; Donald Draganski, M.A.L.S.; Lloyd Engelbrecht, M.S.L.S.; Aline Fairbanks, M.L.S.; Beth Alleman Hamilton, M.A.L.S.; Dorothy W. Ivy, M.L.S.; Martha Kester, M.S.; Mary Lynn McCree, M.A.; Yuri Nakata, M.A.; Glenn R. Scharfenorth, M.A.L.S.; Richard Seidel, M.L.S.; William D. Thrasher, M.A.L.S.

### Instructors

Elaine Azuma, M.S.; Mary A. Bamberger, M.A.; Richard Barton, M.A.L.S.; Raymond H. Deutsch, M.A.L.S.; Michele Floersch, M.A.L.S.; Deirdre A. Ford, M.L.S.; Harry L. Frudd, M.A.L.S.; Janice Hall, M.L.S.; Barbara J. Hycnar, M.A.L.S.; Bozica Ivanovich, M.A.; Linda Tzeng Lee, M.S.; Marvin O. Meier, M.A.L.S.; Gladys C. Odegard, M.A.L.S.; Alan J. Schrader, M.M.; Richard A. Sherwood, M.A.L.S.; Virginia Stewart, M.A.; Raminta Svipas, M.S.; Ghada H. Talhami, M.A.

### Assistants

Vida Marija Biciunas, B.A.

The Library of the University of Illinois at Chicago Circle affords resources for students in all curricular areas and provides accruing collections of materials for current and projected graduate programs and for faculty research. As of July, 1969, Library holdings included more than 300,000 books and bound periodicals, 133,00 government documents, 7,00 pamphlets, 46,000 maps, and an extensive and expanding collection of microfilmed materials. Currently, the Library receives more than 4,000 periodicals. Phase two of the Library construction, completed in 1968, provided seating for 3200 students and increased the book capacity to 500,000 volumes. Students have full access to books and other materials, which are shelved on open stacks.

### First Floor

*Reserve Book Room* (assigned collateral reading materials).

*Curriculum Library.*

*Library Administrative Offices.*

### Second Floor

*Circulation Desk*

*Reference Desk*

*Interlibrary Loan Office*

*Technical Processes Office*

*Xeroxing Office*

Various sets of encyclopedias, indexes to periodicals and newspapers, and other biographical and bibliographic tools are available in the *Reference Collection*. The card catalogue, the newspaper collection, displays of selected new books, all periodicals (except science periodicals), and facilities for reading materials in microfilm also are located on the second floor.



### Third Floor

All monographic materials on religion, psychology, philosophy, and history (Library of Congress Classes A through H); the *Documents Section*; and the *Rare Book Room* are located on this floor. The rare or special-book collections, which may be used only in the Rare Book Room, contain material on the political and military history of 17th century France, slavery and the Negro, modern poetry, and many individual authors. A collection of approximately 45,000 maps, which include topographic and political maps issued by government and private agencies, and a large collection of atlases are also on the third floor.

### Fourth Floor

Space is allocated to geography, economics, sociology, political science, law, education, music, fine arts, language, literature, science, medicine, and technology (Library of Congress Classes J through V). All scientific and technological periodicals are available on this floor. The *audio center*, which provides both individual and group facilities for listening to recorded music, poetry, drama, and other recorded materials, also is located on this floor.

### Basement

#### *Manuscript Section*

#### *The University Archives*

The *Manuscript Section* and the *University Archives* are located in this section of the Library. The Manuscript Section contains documents, manuscripts, correspondence, and other records associated with individuals and organizations in Chicago. In this section and in the Preston Bradley Library, located in Jane Addams' Hull House, significant materials concerning Jane Addams and Hull House are kept. Other files in the Manuscript Section include those of the Chicago Urban League, the Chicago Board of Trade, the League of Women Voters, the Metropolitan Housing and Planning Council; the papers of Ester Kohn, Barrett O'Hara, and others; the records of the Juvenile Protective Association, the Immigrants' Protective League, and other similar materials. Faculty, graduate students, and undergraduates recommended by a member of the faculty may use these papers for research.

Information about the University Archives may be obtained in Room B-242. Among the archives are official records of University offices and departments that have no further use for these records in their current operations. University Archives also maintains a file of Chicago Circle Catalogs and other published items.

## The Computer Center

Recognizing that large-scale electronic computers are now in widespread use as a research tool in nearly all scholarly disciplines, the University has established a Computer Center that is charged with administering a facility to meet the educational and research needs of the University.



The present equipment at the Computer Center includes an IBM 360 model 50 computer with 393,816 bytes of 2 microsecond core storage and 1,050,176 bytes of 8 microsecond core storage. Also in operation is an IBM 1800 process control computer with 16,536 words of 2 microsecond core storage and a system of remote consoles.

The staff members of the Computer Center teach courses in programming and numerical analysis in cooperation with the Department of Mathematics and the College of Engineering. The staff also assists other departments in utilizing the equipment for both teaching and research throughout the campus.

## **The Office of Instructional Resources**

The Office of Instructional Resources (OIR) is the agency responsible for planning, developing, and, when appropriate, administering technological aids to instruction and for advising and assisting the faculty in using these aids to improve the effectiveness and efficiency of instruction.

The Programmed Instruction Division works with faculty members in developing programmed instruction for academic courses and in locating and using programmed materials from outside sources.

The Course Development Division works with departments in the design and coordination of course experimentation.

The Television Division produces and distributes instructional television presentations and supports other television applications in teaching.

The Audio-Visual Division operates two units: an instructional materials availability center, which assists faculty members in identifying, locating, and obtaining films from rental sources and houses the OIR permanent instructional materials collection; and the instructional materials production facility for the professional preparation of slides, overhead transparencies, photographic prints, exhibits, and related materials, including graphic design work when required.

## **Honors Programs**

Programs for superior students are offered in several categories at Chicago Circle beginning in the freshman year. Opportunities for applicants with superior records vary from one college to another because of the comprehensiveness of the curricula offered at the University of Illinois. In the main, a student classified as superior has special advisers and enters special courses or sections of courses as a freshman and as a sophomore; as a junior and senior he is encouraged to participate in special programs for majors in his department. These programs usually include individual work, seminars, and, in some cases, a senior thesis.

*The Edmund J. James Scholars* are selected from each freshman class entering the University of Illinois and from the currently enrolled freshmen and sophomores. A group of superior students, the James Scholars, are named in honor of one of the University's most distinguished presidents. The James Scholars have available to them resources of the University not normally utilized by the average college student. Honors courses that are consistent with the student's superior ability and that challenge his intellectual development will be made available at an increasing rate; hence, the program offers unusual opportunities for able and industrious students and provides an excellent background for graduate and professional study. A James Scholar is expected to carry at least one honors course every quarter when such courses are available to him. James Scholars may be dropped from the program at their own request or for inadequate scholarship.

Although no monetary award is presently given to James Scholars, most of them are eligible for one or more of the scholarships that are available through national, state, or University sources; hence, James Scholars who need financial assistance should apply for monetary scholarships.

Seniors in Illinois high schools who have demonstrated high academic potential are eligible to apply for admission to the James Scholar Program. Applications from students in high schools outside the state are also considered. Students who have already been graduated from high school are eligible as entering freshmen; students who were not initially chosen as freshmen may be admitted to the program later. The final selection of James Scholars is made on the basis of high school grades, performance on aptitude and achievement tests, other test scores, and the recommendation of high school principals and counselors. Students in residence are chosen on the basis of their performance in college and the recommendations of their instructors.

Further information about the James Scholar Program and an application for designation as such may be obtained by addressing the Director, University Honors Programs, Room 708 Chicago Circle Center, University of Illinois at Chicago Circle, Box 4348, Chicago, Illinois 60680.

## Academic Honors

Recognition for superior academic achievement at Illinois is given by the University and by the college and department in which a student is enrolled.

To be considered for academic honors in any quarter, a candidate must be a full-time student—one who completes 12 academic hours exclusive of required physical education, basic military science, courses in which he has excused or deferred grades, (except in an honors course), and courses completed by an examination for which "pass" is recorded.

*The Honors Day Convocation* annually gives public recognition to superior undergraduate students. The printed program for this convocation

contains the names of those students who have been on the Dean's List of their colleges for at least three of the four quarters since the last Honors Day Convocation. If a student has been in residence all four quarters, he must have a cumulative grade-point average of 4.000 (B) or more in addition to being on the Dean's List for three of the four quarters.

The names of new freshmen or of transfer students who enter in the fall quarter will be included if they have been on the Dean's List for the fall and winter quarters preceding the Honors Day convocation.

Transcripts prepared for these students will carry the notation, "Honors Day Recognition, 19—."

*Edmund J. James Scholars* who have maintained since the last Honors Day Convocation the academic record required by the James Scholar Program will also be listed in the Honors Day program. The transcripts of these students will carry the notation, "Edmund J. James Scholar, 19—."

*The Dean's List* for the colleges and divisions is composed each quarter of those full-time students who have an average of B (4.000) or better in all courses, exclusive of basic military science and required physical education. This list is posted in the college offices and is sent to the Office of Public Information for distribution to the press.

## Graduation with Honors

The Chicago Circle Senate and the Board of Trustees establish the criteria under which students are awarded departmental, college, and University honors.

*Department Honors* (Departmental Distinction) may be awarded if the student has met the criteria established by the department in which he completes his major and by his college. His diploma will carry the designation Distinction, High Distinction, or Highest Distinction, as appropriate.

*General College Honors* are awarded the student recommended by his dean by virtue of a sufficiently high scholastic average and the fulfillment of scholastic and other conditions determined by the college from which the student will be graduated. His diploma and his transcripts carry the notation of such an award.

Graduation with College Honors gives the student a favorable position when he is considered for a graduate fellowship, an unusual job-placement opportunity, or any other competitive situation.

*The Book of Academic Honors* carries the names of those students who have at least a 4.500 cumulative average, from college entrance through the quarter prior to graduation, for all work taken at the University, exclusive of basic military science and required physical education, and who are

in the top 3 percent of the students in their college who will be graduated with them. A transfer-student candidate for listing in the Book of Academic Honors must have earned 60 or more quarter hours at Illinois and have an Illinois cumulative average and a total cumulative average as high as the lowest average listed for those honors candidates in his college who have completed all work at Illinois.

## **Honor Societies**

Additional prizes and awards are made to both undergraduate and graduating students who have meritorious records.

### **Alpha Lambda Delta**

Membership in this national honor society is open to all freshman women who meet the qualifications established by the National Council of Alpha Lambda Delta. To be eligible, a freshman candidate must be a full-time student who has attained a 4.5 grade-point average at the end of the first, second, or third quarter of her freshman year.

### **Phi Eta Sigma**

Membership in this national honor fraternity is open to all freshman men who meet the qualifications established by the National Grand Chapter of Phi Eta Sigma. To be eligible, a freshman candidate must be a full-time student who has attained a 4.5 grade-point average in his first academic quarter or a 4.5 cumulative average within the first two or three quarters of his freshman year.

### **Phi Kappa Phi**

Founded in 1897 (University of Illinois chapter in 1933), Phi Kappa Phi is an honor society for juniors, seniors, and graduate students. Faculty members are also elected to the extent of ten each year.

The society proffers membership to students of high caliber who meet its requirements:

For juniors, a cumulative grade-point average of 4.75.

For seniors, a cumulative grade-point average of 4.50.

For graduate students, successful completion of the preliminary examination, no more than two B grades, and no grades below B.



## Awards, Prizes, Scholarships, Grants in Aid

*Alpha Kappa Psi* (the oldest national business fraternity) scholarship, awarded to the high ranking male student in business administration

*Lydia E. Parker Bates* scholarships for students in architectural engineering, architecture, art, landscape architecture, and urban planning

*Bell Honors Awards* in engineering

*Albert Bellamy* scholarships

*Henrietta Curtis Hill Braucher Memorial* scholarships

*Thomas R. Bump* grants in aid to assist underachieving and underprivileged ghetto students

*Carson, Pirie, Scott & Company* grants in aid for designated employees of Carson, Pirie, Scott

*Chicago Circle Physics* scholarship for a junior or senior enrolled in one of the physics curricula and recommended by the Department of Physics

*Edward M. Cohon and Associates Prize* in architecture

*Henry Dubin Memorial Prize* in architecture

*Ernst and Ernst Scholarship* for a student in accounting selected by the accounting faculty

*B.B. Freund Award* for excellence in chemistry

*Winifred Geldard* scholarship for a student majoring in economics with a cumulative grade point average of at least 4.25

*Geography Society of Chicago Award*

*The Gordon Lee Goodman Award for Distinction in Undergraduate Studies in History.* Friends and relatives of the late Gordon Lee Goodman, associate professor of history at the University of Illinois at Chicago Circle, have established a fund in his memory "to support excellence in the undergraduate program in history." Annually the Department of History at Chicago Circle designates at least one and not more than four Gordon Lee Goodman Scholars in History. The student must have attained or be about to attain senior standing, must be a major in history, and must have demonstrated excellent scholarship in the discipline. Designation as a Gordon Lee Goodman Scholar in History carries a stipend that will be paid from the income of the memorial fund. The Department of History maintains a permanent record of all who have been named Gordon Lee Goodman Scholars in History and will identify students so named in all appropriate University announcements and publications.

*Roscoe E. Harris Award* for excellence in physics

*Illinois Congress of Parents and Teachers* scholarships for students enrolled in a teacher education curriculum

*Robert E. Kennedy* scholarships for students interested in the foundry field and enrolled in mechanical engineering, electrical engineering, or another curriculum related to the foundry industry

*A.M. Kinney and Associates* scholarship for a student enrolled in the College of Art and Architecture

*Link Belt Educational Fund* scholarships for students enrolled in the engineering or commerce curricula

*National Council of Alpha Lambda Delta Award* made to the highest ranking senior of the chapter

*Calvin Barnes Nicholls Memorial* scholarships for men in any field of engineering

*LaVerne Noyes* scholarships for students who are descendants of World War I veterans

*John W. Page Foundation* grants in aid for students with financial need who do not qualify for scholastic awards

*Arthur D. Pickett Memorial* scholarship

*Raffeld Family Scholarship* for a student majoring in Speech and Theatre

*Regensteiner Corporation* scholarships annually awarded to three needy Chicago area residents

*Gretchen Johanna and Paul Charles Schilling* scholarships

*Theodore R. Schlader Memorial* scholarships for students in architecture, architectural engineering, and in electrical engineering or other engineering fields

*John S. Schweppe* scholarship for a student in the College of Business Administration

*Frederick D. Secor Memorial* scholarships for students in electrical engineering

*Alice D. Taylor* grants in aid for students with demonstrated financial need and enrolled in any undergraduate curriculum

*University Club Foundation of Chicago* scholarships

*Various Donors Student Aid* scholarships primarily used as "matching funds" for Educational Opportunity Grants

*Ernest C. Van Keuren Award* for excellence in the humanities

*University of Illinois Foundation*

*Leon Weisberg Memorial* scholarship for a junior or senior majoring in architecture

*Wensel Morava* scholarships for students of Czechoslovakian descent

*Etta and Laura Beach Wright* scholarships annually awarded to two students

*Leigh F.J. Zerbee* scholarships for students enrolled in Civil Engineering and specializing in Military Science

## The Reserve Officers' Training Corps

The principal objective of the college-level Reserve Officers' Training Corps program is to develop commissioned officers for the Army Reserve and the Regular Army. It is specifically designed to enable potential leaders to prepare themselves for effective service in the Army and also offers individuals training in developing the essential qualities of leadership required for success in either a civilian or a military career.

Participation in the college-level R.O.T.C. program is offered on a voluntary basis to qualified male students. Requirements for enrollment are:

1. United States citizenship. An alien may pursue the course if he presents written evidence of his intent to become a citizen.
2. Classification as a full-time student.
3. Ability to qualify for appointment as a second lieutenant before the candidate is 28 years of age.
4. Physical qualifications for a commission.

A student entering the University after successfully completing military training in high school or in a preparatory school that has an accredited Junior Division R.O.T.C. program will be entitled, upon enrollment, to such placement as may be determined by the Professor of Military Science. However, in no case will this placement exceed the first year of the Basic Course.

Instruction is offered through two programs: a four-year and a two-year. The four-year program consists of the Basic Course (the first two years) and the Advanced Course (the last two years). The two-year program alone consists of the Advanced Course and prior attendance at Basic Summer Camp. Both programs include attendance at Advanced Summer Camp between the junior and senior years. Cadets are issued uniforms, textbooks, and equipment necessary for the R.O.T.C. program.

*The Basic Course.* Freshmen normally devote three hours a week to military instruction, which consists of one hour of theory and two hours of leadership laboratory. In addition, the cadet must enroll in a non-military course in one of the following four categories: effective communications, science comprehension, general psychology, or political development and political institutions. This course may be one required for graduation by the cadet's college. Sophomores normally devote four hours a week to military instruction—two hours of class and two hours of leadership laboratory.

*The Advanced Course.* All cadets who have successfully completed the Basic Course, meet the physical and academic requirements, and pass an officer-qualification test and a physical examination are eligible for selection by the Professor of Military Science for the Advanced Course. A cadet selected to enroll in the Advanced Course without prior enrollment in the Basic Course must successfully complete the Basic Summer Camp before such enrollment and have the approval of the Professor of Military Science.

A subsistence allowance of not less than \$50 per month is paid to each cadet in the Advanced Course except during attendance at summer camp, when he is paid one-half of the pay rate of a second lieutenant on active duty with less than two years of duty. Travel to and from camp is at government expense. Meals, housing, medical care, uniforms, and all equipment are also furnished while at summer camp.

*Commissioning.* Upon successful completion of the Advanced Course and completion of the degree requirements, cadets will be commissioned as second lieutenants in the United States Army Reserve, and may be offered a commission in the Regular Army. A student may select from the following list the branch of the Army in which he desires to serve:

Adjutant General's Corps	Infantry
Air Defense Artillery	Medical Service Corps
Armor	Military Intelligence
Chemical Corps	Military Police Corps
Corps of Engineers	Ordnance Corps
Field Artillery	Quartermaster Corps
Finance Corps	Signal Corps
	Transportation Corps

*Deferment* from selective service is granted until completion of the R.O.T.C. program to those cadets who are qualified and are approved by a deferment board composed of military personnel and civilian faculty. If they maintain the required standards, students will retain their deferment throughout the course in military science.

Further information on the program is obtainable by calling 663-3452 or by visiting the Military Science Department, Room 203 Roosevelt Road Building.

## Hospital-Medical-Surgical Insurance

All students enrolled and in attendance at Chicago Circle are covered by this insurance for which they pay a fee of \$7 per quarter at registration. Eligible dependents of insured students (spouse and/or unmarried dependent children under nineteen years of age) may also be insured if the student makes application to the University Insurance Office, 427 University Hall within the first 10 school days of the quarter.

Students enrolled in the spring quarter but who will not attend during the summer quarter may elect to take the insurance for the entire summer quarter by making application to the Insurance Office between May 15 and the tenth day of instruction in the summer quarter. The insured student's eligible dependents may also be included in this coverage.

To provide continuous protection, coverage will extend from the beginning of a quarter through the first day of classes for the next quarter.



See the policy certificate for beginning and terminating dates of coverage.

Claims must be initiated in the Insurance Office, Room 427 University Hall. See also *The Hospital-Medical-Surgical Insurance Fee*.

## The Talented Student Program for Illinois High School Seniors

Upon completion of the junior year in high school superior students who can meet University requirements may attend University classes for college credit in one or more of the four quarters at Chicago Circle or they may enroll for college credit in extramural courses or in correspondence courses offered by the Division of University Extension. (See *Correspondence and Extramural Study*.) Each case is considered individually, and the Director of Admissions and Records, the dean of the college concerned, and the department offering the course must concur in the high school's recommendation as the condition for acceptance. See 1, 2, and 3 below.

Ordinarily, such work taken at the University of Illinois should not be used to accelerate the high school work of a secondary-school student but should be used as a means of broadening and enriching the student's educational program. These students are expected to complete all high school courses required for graduation. The courses taken at the University by superior high school seniors are over and above the regular secondary-school curriculum.

Grades and course credits are recorded on the student's permanent University of Illinois record and appear on any official transcript issued to or for him. If the student enters the University after graduation from high school, the courses are credited toward University graduation if they are applicable to the chosen degree program.

Students applying for admission to extramural or resident courses under the provisions of this program should arrange for the following materials to reach the Office of Admissions and Records within the deadline periods established for other admissions:

1. A recommendation from the high school principal, specifically endorsing the student for admission to a particular course or courses during the time he is also carrying a full high school schedule.
2. A completed application for admission including the \$15 nonrefundable application fee.
3. An official copy of the high school transcript covering all work thus far completed in high school, including a record of courses in progress (if applicable), and the most recent rank in class. This transcript should be accompanied by any available test scores on such examinations as those conducted by the College Entrance Examination Board and the American College Testing Program (ACT). However, these tests are not required.
4. The applicant's own statement of his belief that he is qualified to undertake college-level work, and an indication of the specific course in which he wishes to enroll.

For applications and information for prospective students for this program of study, inquiry should be made to the Director of Admissions and Records, University of Illinois at Chicago Circle, Box 4348, Chicago, Illinois 60680.

## Proficiency Examinations for Enrolled Students

Each quarter the University gives proficiency examinations, similar to regular quarter examinations, in courses ordinarily open to freshmen and sophomores. Proficiency examinations for Rhetoric 101 and 102 are scheduled regularly. In other subjects the student must obtain the consent of the head or chairman of the department concerned. Proficiency examinations in more advanced undergraduate subjects may also be given if the head or chairman of the department recommends and the dean of the college concerned approves. There is no fee for these examinations.

The grade given in proficiency examinations is either "pass" or "fail" but no student receives a "pass" unless he has made at least the equivalent of a C. Neither grade is included in the computation of the student's average, and no official record is made of a "fail."

A student who passes a proficiency examination is given the amount of credit toward graduation regularly allowed in the course if the course is acceptable in his curriculum. However, if such credit duplicates credit counted for his admission to the University, it is not allowed. Proficiency examinations are given only to:

1. Persons who are in residence at Chicago Circle.
2. Persons who, after having been in residence, are currently registered in a correspondence course at the University of Illinois.
3. Persons who are degree candidates at the University and need no more than 15 quarter hours to complete their degree requirements.
4. Persons enrolled at one University of Illinois campus who wish to take an examination being given at another campus must secure an Application for Concurrent Registration from the Office of Admissions and Records.

Proficiency examinations may *not* be taken;

1. By students who have received credit for more than one quarter of work in the subject in advance of the course in which the examination is requested.
2. To raise grades or to remove failures in courses.
3. In a course the student has attended as a listener or as a visitor.

A proficiency examination is not considered an interruption of residence for graduation, nor is credit earned in this examination counted toward satisfying the minimum requirement toward the degree if the last 45 quarter hours must be earned in residence.

## Correspondence Study

High school students who wish to pursue such study should write directly to the Division of University Extension, University of Illinois at Chicago Circle, Box 4348, Chicago, Illinois 60680, for their application instructions. Inquiry should be made at least two weeks prior to the beginning of any session in which they wish to pursue correspondence study. For the summer months, applications should be submitted no later than the middle of May.

## General University Requirements

The academic year consists of three quarters (Chicago Circle and Medical Center) or two semesters (Urbana). Requirements are generally stated in terms of full-time programs.

## Requirements for Graduation

Regardless of the college and curriculum in which he is enrolled, each student must fulfill these specific requirements if he is to be graduated:

1. He must meet the admission requirements.
2. He must remove all deficiencies in entrance credit.
3. He must demonstrate that he is proficient in written English by earning passing grades in Rhetoric 101 and Rhetoric 102 or by passing a proficiency examination or the equivalent. A transfer student may be certified by the Office of Admissions and Records as having been exempted without credit from the equivalent of Rhetoric 102 while previously attending a fully accredited institution.
4. He must earn six quarters of credit in physical education unless he is a transfer student with 90 or more quarter hours of transfer credit, is a veteran, or the University Health Service recommends a waiver on physical grounds. Registration in R.O.T.C. does not exempt a student from the physical education requirements.
5. He must fulfill the general education requirements of a *minimum* of 9 hours in the humanities, 9 hours in social science, and 9 hours in natural science. However, the Colleges and Divisions are authorized to increase these minimum requirements. Consult the graduation requirements of the Colleges and Schools for variations. These general education courses, which must be taken in approved sequences, determined in consultation with the appropriate college office, provide a broad educational base for the major and minor (Liberal Arts and Sciences), for a field of specialization (Business Administration), for the selected option (Art and Architecture, Engineering), or for work in the College of Education and the School of Physical Education.
6. He must meet all of the graduation requirements of the college in which he is enrolled.

7. He must earn the required grade-point average of 3.000 (C) in all work offered for the degree and in all work taken at the University of Illinois.
8. He must satisfy the residence requirement: Either the first 135 quarter hours or the last 45 quarter hours of University work must be taken at Chicago Circle. University of Illinois correspondence and extramural courses neither apply to satisfaction of the residence requirement nor interrupt residence.

For the specific college requirements that must also be met, see the sections of this Catalog devoted to the colleges.

*Concurrent, or Dual, Enrollment*—In general, it is considered scholastically hazardous to enroll concurrently at both a campus of the University of Illinois and another accredited institution. A student contemplating such concurrent enrollment must get approval from the dean of his college before he can so enroll.

## Degrees

A degree from the University of Illinois is awarded by action of the Board of Trustees on recommendation of the appropriate College and Senate. Degrees are conferred four times a year, at the end of each quarter. The student receives the degree in a stated curriculum. The graduation requirements in effect for a curriculum at the time of the student's admission to it become his graduation requirements unless he elects to meet revised degree requirements that subsequently may apply to that curriculum.

Approval of any necessary substitutions in graduation requirements rests with the college in which the student is enrolled.

The degree for each major is stated, together with the degree requirements, in the appropriate college section of this Catalog.

## Quarter Hours

A University quarter hour represents one classroom hour of fifty minutes weekly for one quarter in lecture or recitation, and either the necessary preparation time or a longer time in laboratory or other work. It is expected that most students will spend two hours preparation for one hour per week of lecture or recitation. Each University quarter hour of credit is thus understood to represent at least three hours of the student's time, and the credit value of a course is calculated in quarter hours on that basis. The number of quarter hours allotted each course is listed immediately after the course title in the "Courses of Instruction" section. "English 113. American Literature I. 4 hours" is an example. The number of quarter hours earned by the student determines, during his undergraduate period, his classification within the University.

45 quarter hours—sophomore standing  
 90 quarter hours—junior standing  
 135 quarter hours—senior standing

**Note:** 180 quarter hours constitute the minimum required for a degree. The required number of hours varies within the colleges and curricula. The student should refer to the section of this Catalog covering his college and curriculum to determine the hours requirement for his particular degree. His college office will also provide this information. To convert semester hours to quarter hours, multiply by  $\frac{3}{2}$ ; to convert quarter hours to semester hours, multiply by  $\frac{2}{3}$ . For example, 45 quarter hours equal 30 semester hours.

## The Grading and Grade-Point Systems of the University

Each student seeking a degree should thoroughly understand these systems and the meaning of the following grades and symbols:

### Grades:

A—Excellent	D—Poor
B—Good	E—Failure
C—Fair	Ab—Failure because of absence from the final examination without excuse.

Students enrolled in the College of Liberal Arts and Sciences may elect a “pass-fail” grade option; see *Pass-Fail Grade Option*, the College of Liberal Arts and Sciences.

### Symbols:

**W**—Withdrawn, without penalty, from the course.  
**Ex**—Excused from the final examination or from assignments at the option of the instructor or by the dean; status undetermined until the examination is written. An Ex grade must be made up by the end of the quarter following that in which it was received or it automatically becomes an E.  
**Df**—Grade deferred (independent study courses only).

**Grade Points.** Each grade has a specific value, which is expressed in grade points. When the grade-point average is computed, the following weights, or values, are used for each grade:

A—5 grade points	C—3 grade points
B—4 grade points	D—2 grade points
Ab and E—1 grade point each	



*Computing the Grade-Point Average.* Multiply the number of hours of each grade by the weight, add the products, and divide by the number of hours. Below is a grade-point computation for a student who has earned 3 hours of A, 6 hours of B, 3 hours of C, 2 hours of D, and 4 hours of E.

Grade	Hours	Weight	Grade Points
A	3	5	15
B	6	4	24
C	3	3	9
D	2	2	4
E	4	1	4
	<hr/>		<hr/>
	18		56
			<hr/>
			18
			<hr/>
			56

The student's grade-point average is 3.111.

## Electives

The terms "restricted electives" and "free electives" must be understood thoroughly if errors in scheduling are to be avoided.

*Restricted Electives.* While they differ from required courses, which must be taken by all students in a given curriculum, some electives are nevertheless restricted in scope and pertain to an area within which limited choice is permitted. For example, electives in general education are restricted to approved sequences.

*Free Electives.* After the University and the college requirements for graduation have been fulfilled, the student may still need to enroll in additional courses to earn the minimum number of hours needed for his degree. These additional hours are earned by enrolling in courses classified as free electives for those for whom they are not required. The value of free electives lies in the further broadening they provide for the student's total education.

## Transfer and Withdrawal

*Transfer to and from Urbana-Champaign* is governed by specific regulations. See *A Readmission Applicant*. Since Urbana-Champaign is on the semester system and Chicago Circle is on the quarter system, such transfer is most easily made at the end of an academic year. A student at Chicago Circle who intends to transfer to Urbana may do so by securing an application from the Office of Admissions and Records. A student at Urbana-Champaign who wishes to transfer to Chicago Circle may secure the appropriate application at the Office of Admissions and Records at Chicago Circle.

*Admission to the Colleges at the Medical Center* (Graduate, Medicine, Dentistry, Nursing, and Pharmacy). Application must be made on official application blanks obtained from the Office of Admissions and Records of the University of Illinois at the Medical Center, 1853 W. Polk Street, P.O. Box 6998, Chicago 60680.

*Withdrawal from the University* is also governed by specific regulations that the student should observe to protect his academic standing. Failure to do so will result in the grade in each course in which he is registered appearing as Ab (absent) on his record. See the *Student Handbook* of the University of Illinois at Chicago Circle. Withdrawal initiated during the final ten days of instruction requires submission of a petition in addition to the application for readmission if a student subsequently wishes to return to the University.

A student who has been charged with an offense that may result in disciplinary action may not officially withdraw from the University until the hearing of his case has been conducted by the appropriate disciplinary committee.

*Withdrawal to Enter Military Service.* If withdrawal occurs during the first five weeks of instruction, the student does not receive any academic credit. If withdrawal occurs during the sixth to eighth weeks (inclusive), he will receive one-half credit in those courses in which his grades are C or better at the time of withdrawal and W (withdrawn without penalty) in those courses in which his grades are below C. After the eighth week, full credit is allowed for all courses in which he is earning C or better, and W is recorded for courses in which he is receiving grades below C.

The above regulations are effective *only* if the student goes on active duty within ten days after the withdrawal, and it is his responsibility to present proof of that fact. The most effective way of presenting such proof is to have the personnel officer of the unit to which he is assigned certify to the University the date of his assignment to active duty.

For regulations governing refunds to the student who enters Military Service, see *Refunds*.

# Admission to the University

As a state-supported, comprehensive university, the University of Illinois seeks to provide a higher education for those who will profit from an intellectually challenging program. The admission requirements are designed to identify those who possess the scholastic ability and maturity needed to succeed in and benefit from such an atmosphere.

A qualified applicant seeking admission as a full-time degree candidate may enter any college or school of the University of Illinois at Chicago Circle (with the exception of the College of Architecture and Art) at the beginning of the fall, winter, or spring quarters. Beginning-freshman applicants for the College of Architecture and Art are admitted only at the beginning of the fall and spring quarters. Students whose first registration is in the summer quarter are not automatically eligible to continue in the fall quarter; they must apply separately for that quarter and meet full admission requirements. See *Admission to the Summer Quarter Only*.

**Dual, or concurrent, enrollment**—In general it is considered scholastically hazardous to enroll concurrently at both a campus of the University of Illinois and at another accredited institution. An applicant contemplating such concurrent enrollment should submit a written request to the Office of Admissions and Records at the time he submits his application. When all records in support of his application are on file, they will be forwarded to the dean of the Chicago Circle college to which he is seeking admission. Only if that official approves can the request for concurrent enrollment be permitted. *Exception:* Admission to the winter quarter may be approved for a student enrolled in the fall semester of a semester-system institution if he satisfies all other requirements and is carrying 6 or fewer semester hours.

*Concurrent Registration* at campuses of the University of Illinois is permissible. A student enrolled at Chicago Circle or at the Medical Center may obtain an Application for Concurrent Registration at the Office of Admissions and Records of his primary campus.



## Admission Requirements

A *Beginning-Freshman* applicant must meet two sets of requirements: the general University admission requirements and the requirements of the college or school he wishes to enter. See *Requirements for Admission to Undergraduate Study*. General University requirements state that the applicant must:

1. Be at least 16 years of age. A 15-year old applicant who meets all other admission requirements may petition for admission.
2. Be a graduate of an accredited high school.
3. Rank in the upper half of his class at graduation or qualify through a sufficiently high score on the American College Test (ACT) or the Scholastic Aptitude Test (SAT) of the College Entrance Examination Board. Non-residents of Illinois must rank in the top quarter of the high school class. See *Residence Classification*.
4. Present 15 units of credit, including those specified in *Requirement for Admission to Undergraduate Study*.

A unit represents one academic year of high school work that consists of 120 sixty-minute periods in the classroom. Two hours of work requiring little or no preparation outside the classroom are considered as having the same value as one hour of prepared classroom work. Fractional credits of less than  $\frac{1}{2}$  unit are not accepted. Less than 1 unit of work is not accepted in a foreign language, elementary algebra, plane geometry, physics, chemistry, or biology. The units that meet general University requirements and college or division requirements may be selected from the following groups:

- A. *English*. A minimum of 3 units, including English 5 and 6 (junior year). Only courses in the history and appreciation of literature, composition (including oral composition when given as a part of a basic English course), and grammar count toward the 3 units required for admission to all curricula.
- B. *Foreign Language*. The requirement for admission to a curriculum that requires a foreign language is fulfilled by 2 units in any one foreign language taken in an accredited high school. Alternatively, the language requirement for admission may be fulfilled by passing entrance examinations for 2 units in any one foreign language regularly taught in the University. Less than 1 unit is not accepted.
- C. *Mathematics*. A minimum of 1 unit each in algebra and plane geometry is required for admission to all curricula; however, some curricula require additional mathematics. General mathematics or other courses in mathematics may be accepted in lieu of algebra and plane geometry where the content of the course is essentially the same as that ordinarily included in algebra and plane geometry as determined by the Department of Mathematics at the University of Illinois. If such courses are not equivalent to the prescribed algebra and plane geometry courses or to more advanced courses, they will be accepted as miscellaneous credit.

D. *Science.* Astronomy, biology (or botany and zoology), chemistry, geology, and physics are acceptable. General science will not be accepted as a unit of required science but will be counted as an elective in satisfying the required total of 15 units of acceptable credit.

E. *Social Studies.* Government, commercial or economic geography, economics, history, philosophy, psychology, and sociology are acceptable.

Credit for work completed prior to the ninth grade is accepted by the University if it appears on the transcript of an accredited high school and is certified by the principal to be for a course equivalent in quality and quantity to the course ordinarily offered in that high school. Such credit usually applies to elementary algebra and foreign language; however, it might apply to any subject.

*A Transfer-Student Applicant*, one who, prior to applying for admission to Chicago Circle, has completed, with passing or failing grades, 18 or more quarter hours (or 12 or more semester hours) of university-level work, must meet all the requirements for beginning freshmen (except those for high school rank and test score) and must have achieved a minimum transfer grade-point average of 3.250. See *The Grading and Grade-Point Systems*.

*Exception:* A resident of Illinois whose average is 3.000 or above but is below 3.250 may petition for admission. His petition must be approved by the dean of the college he wishes to enter and by the Director of Admissions and Records. A nonresident of Illinois whose scholastic average is less than 3.250 will not be admitted. See *Residence Classification*.

Some of the colleges have established higher requirements for admission to and for continuation in certain curricula. See *Requirements for Admission to Undergraduate Study*. All transfer grades are used in computing the transfer student's average, including those earned in courses for which credit is not accepted on admission.

A student transferring to the University on probation or dropped from a previous collegiate institution for disciplinary reasons must submit a petition to the Director of Admissions and Records, who will forward the petition to the appropriate agency.

*A Readmission Applicant*, a former student at the University of Illinois who has previously attended any of the three campuses of the University as a regular student, will be considered for readmission on the basis of his status at the time he left the University, any college work he has completed elsewhere since his last attendance at the University, and the capacity at Chicago Circle.

A student who did not complete at Chicago Circle the quarter immediately preceding the one in which he wishes to enroll is considered a "former student." If he wishes to enroll in the fall quarter, the previous spring quarter is the "immediately preceding" quarter unless that quarter was used as the student's Off Quarter Vacation. In that case, if he was enrolled

in the summer quarter, it would be the "immediately preceding quarter."

A former student who left the University on academic drop status, regardless of whether he has attended another collegiate institution in the interval, or who withdrew during the final ten days of instruction of a quarter, must petition the dean of the college concerned when he applies for readmission.

A former student who left the University on clear status or on probation but has attended another collegiate institution from which he was dropped or where he has earned a scholastic average below 3.000 may be readmitted to the University only upon approval of his petition by the dean of the college concerned.

Scholastic probation at the University of Illinois may not be cleared by attendance at another institution except by special action of the dean of the student's college.

A former student who was dropped for disciplinary reasons must submit a petition to the Director of Admissions and Records, who will forward the petition to the appropriate agency.

*A foreign student* (one who resides outside the United States of America) may apply for admission by presenting credentials substantiating his superior scholastic achievement and his official certification either by the educational institution issuing the document or by a local or United States government official. An applicant whose native language is not English must take an English proficiency test even though he may have attended an institution or institutions where some or all of the instruction was presented in English. See *Foreign-Student Admission Procedures* for information about filing an application.

*An Irregular-Student Applicant* is a person holding a Bachelor's degree who wishes to continue study by registering in an undergraduate college. To be admitted to this classification, a student must obtain the approval of the dean of the college he wishes to enter and must fulfill the undergraduate admission requirements. The appropriate petition forms may be obtained in the Office of Admissions and Records.

*Residence Classification* of an applicant is determined on the basis of information given on his application and other credentials. Fees are assessed in accordance with this determination. If the student believes he has a legitimate case for change of status, he may, by a petition filed with the Office of Admissions and Records, request a change.

Petitions will be considered *within 30 days* from the date designated in the official University calendar as that upon which instruction begins for the quarter for which the fee is payable. However, if nonresident tuition was not assessed on or prior to that date, the claim for refund may be filed *within 30 days* after the nonresident charge was assessed and the student was given notice of its assessment. If the student expects to ask for a change of residence classification, he should request that the change be made prior to registration.

# Requirements for Admission to Undergraduate Study

Colleges and Curricula	Minimum Scholastic Requirements		Subject Requirements	Minimum Number of Units
	High School Rank	Transfer Average		
<b>ARCHITECTURE AND ART</b> Architecture <sup>1</sup> (All Programs)	Residents: Upper ½ or sufficiently high test scores.	3.250	English Algebra Plane Geometry Trigonometry One Foreign Language One or more units in each of the following for a total of Science (except General Science) Social Studies	3 2 1 ½ 2 4
	Nonresidents: Top ¼			
<b>Art</b> (All Programs)  History of Architecture and Art			English Algebra Plane Geometry One Foreign Language One or more units in at least two of the following for a total of Foreign Language (in addition to the two units required) Mathematics (beyond Algebra and Plane Geometry) Science (except General Science) Social Studies	3 1 1 2 5
<b>BUSINESS ADMINISTRATION<sup>1</sup></b> (All Programs)	Residents: Upper ½ or sufficiently high test scores. Nonresidents: Top ¼	3.250	English Algebra Plane Geometry One Foreign Language Science (except General Science) Social Studies	3 2 1 2 2 2

<b>EDUCATION</b> Curriculum in Teacher Education (Elementary)	Residents: Upper $\frac{1}{2}$ or sufficiently high test scores. Nonresidents: Top $\frac{1}{4}$	Under 90 hours: 3.300  90 hours or more 3.500	English Algebra Plane Geometry One or more units in at least three of the following for a total of Foreign Language (at least two units in the same language) Mathematics (beyond Algebra and Plane Geometry) Science (except General Science) Social Studies	3 1 1 7
<b>ENGINEERING<sup>1</sup></b> (All Programs)	Residents: Upper $\frac{1}{2}$ or sufficiently high test scores. Nonresidents: Top $\frac{1}{4}$	3.250	English Algebra Plane Geometry Trigonometry One Foreign Language* One or more units in each of the following for a total of Science (except General Science) Social Studies  *Students deficient in foreign language may be admitted with the provision that the deficiency is removed during the first two years.	3 2 1 $\frac{1}{2}$ 2 4
<b>LIBERAL ARTS AND SCIENCES</b> Curricula: Administration of Criminal Justice, General*, Home Economics <sup>2</sup> , Occupational Therapy <sup>2, 3</sup> , Medical Record Administration, Medical Technology, Preprofessional curriculum in nursing, Pre-pharmacy. *For majors in this curriculum, see Academic Majors	Residents: Upper $\frac{1}{2}$ or sufficiently high test scores. Nonresidents: Top $\frac{1}{4}$	3.250	English Algebra Plane Geometry One Foreign Language One or more units in at least two of the following for a total of Foreign Language (in addition to the two units required) Mathematics (beyond Algebra and Plane Geometry) Science (except General Science) Social Studies	3 1 1 2 5

<sup>1</sup> Applicants who meet the quantitative mathematics requirements but do not present specific units in advanced algebra and trigonometry may be considered to have met these requirements if they present other courses in mathematics which have algebra and plane geometry as prerequisites.

<sup>2</sup> Limited program only

<sup>3</sup> Special Requirement: Recommendations from the University Health Service and the Director of Occupational Therapy Curriculum (Medical Center).



Colleges and Curricula	Minimum Scholastic Requirements		Subject Requirements	Minimum Number of Units
	High School Rank	Transfer Average		
Teacher Education (Secondary) Curricula: Biological Sciences, Chemistry, Earth Sciences, English, French, Geography, German, History, Mathematics, Physics, Political Science, Sociology, Spanish, Speech.	Residents: Upper $\frac{1}{2}$ or sufficiently high test scores. Nonresidents: Top $\frac{1}{4}$	Under 90 hours: 3.300	English Algebra Plane Geometry One Foreign Language One or more units in at least two of the following for a total of Foreign Language (in addition to the two required) Mathematics (beyond Algebra and Plane Geometry) Science (except General Science) Social Studies	3
		90 hours or more: 3.500		1 1 2 5
Preprofessional Curricula: Dentistry Veterinary Medicine		3.500		
Curriculum in Forestry <sup>1</sup>		3.250	English Algebra Plane Geometry One or more units in at least two of the following for a total of One additional unit in English One Foreign Language (at least two units in the same language) Mathematics (beyond Algebra and Plane Geometry) Science (except General Science) Social Studies	3 1 1 5



Curriculum in Chemistry <sup>2</sup>	Residents: Upper $\frac{1}{2}$ or sufficiently high test scores.	3.250. For Juniors, Seniors, 3.500	English Algebra Plane Geometry Trigonometry One Foreign Language One or more units in each of the following for a total of Science (except General Science) Social Studies	3 2 1 $\frac{1}{2}$ 2 4
Curriculum in Physics <sup>2, 3</sup>	Nonresidents: Top $\frac{1}{4}$			
<b>PHYSICAL EDUCATION<sup>4</sup></b> Curricula Physical Education for Men Physical Education for Women		Under 90 hours: 3.300 90 hours or more: 3.500	English Algebra Plane Geometry One or more units in at least 3 of the following for a total of One Foreign Language (at least two units in the same language) Mathematics (beyond Algebra and Plane Geometry) Science (except General Science) Social Studies	3 1 1 7

<sup>1</sup>Limited Program Only.

<sup>2</sup>Applicants who meet the quantitative mathematics requirements but do not present specific units in advanced algebra and trigonometry may be considered to have met these requirements if they present other courses in mathematics which have algebra and plane geometry as prerequisites.

<sup>3</sup>A combined average of 3.500 in all physics and mathematics courses is also required.

<sup>4</sup>Special Requirement: Recommendation from the Director of the School of Physical Education.

## Substitutions for and Exemptions from the Admission Requirements

*Entrance Examinations.* Students who do not meet the high school subject requirements, or who are not high school graduates, or who have been graduated from an unaccredited secondary school may remove these deficiencies by passing examinations specified by the University of Illinois.

*General Educational Development Tests.* The high school level General Educational Development Tests (GED Tests) cover the following subjects: English, mathematics, social studies, and general science. Successful completion of the tests satisfies the following admission requirements:

1. English and social studies subject requirements.
2. High school graduation.
3. Validation of credits earned in and graduation from an unaccredited high school.
4. Establishment of rank for a person who has not been graduated from high school.

Completion of the tests does *not* satisfy the algebra-geometry requirement or the science requirement. Credit in those subjects must be presented from accredited sources.

The General Educational Development Tests may be taken by persons in these categories:

1. Persons 19 years or older who have not been graduated from high school.
2. Persons, regardless of age, who have not been graduated from high school, who have been out of high school for one year, and who have written approval of the Director of Admissions and Records.

The University of Illinois does not accept credit granted through the General Educational Development college-level examinations.

*American College Test (ACT).* Applicants who meet the age requirement for admission to the University may use the American College Test in lieu of the General Educational Development Tests to:

1. Validate credit earned in an unrecognized high school.
2. Meet the requirement of high school graduation.
3. Establish high school rank in class.
4. Satisfy specific subject deficiencies.

The English credit allowed for the ACT satisfies the English requirement for admission. The mathematics credit allowed for the ACT does not satisfy the algebra-geometry requirement for admission.

*Subject Examinations* in certain areas may be requested by a student who, lacking one or more of the high school requirements, feels he has sufficient knowledge to pass the prescribed examination. He should initiate his request in the Office of Admissions and Records.

*Admission by Special Action.* A student who is deficient in one or more of the admission requirements may be admitted, with the approval of the Director of Admissions and Records and the dean of the college he wishes to enter, provided he submits evidence that clearly establishes his ability to do satisfactory work in the curriculum in which he wishes to enroll.

## The 45-Hour Rule

The admission requirements covering high school graduation and specific high school subjects (*except* when those subjects are prerequisites for courses required for a degree at Chicago Circle) may be waived for those students in the two categories below who have completed 45 or more quarter hours of advanced standing and have maintained at least a 3.250 average in all work attempted. (See *exception* for Illinois residents.)

1. Transfers to the University from fully accredited junior and/or senior colleges.

2. Transfers from one college to another within the University of Illinois.

All other requirements established for the admission of a transfer student to the curriculum of his choice must be met. Some curricula require a minimum scholastic average higher than 3.250. See *Requirements for Admission to Undergraduate Study*.

## Admission to the Summer Quarter Only

Because of the demand from Chicago-area residents for nondegree programs during the summer, admission may be granted for that quarter only. The requirements are:

1. For a Beginning Freshman: graduation from high school.

2. For a Transfer Student (including those on probation): eligibility to return to his former institution.

3. For a Readmission Applicant: good standing (including those on probation): on the last campus attended at the University of Illinois.

Students in categories 2 and 3 above who are not in good standing should obtain a list of full requirements from the Office of Admissions and Records.

Summer-quarter-only students are *not* admitted to the several academic colleges at Chicago Circle and do not submit regular admission applications; they must procure from the Office of Admissions and Records the special application form "Summer Quarter Only." Requests for this form may be made on and after March 1.

Applications for admission to the summer quarter 1971 and all subsequent quarters must be accompanied by the nonrefundable application fee of \$15.

Continuation for an ensuing fall quarter as a degree candidate at Chicago Circle requires submission of the regular application blank and all necessary supporting documents, and fulfillment of the admission requirements for the desired curriculum.

## Rolling Admissions Program

Chicago Circle operates on a "rolling admissions" program, under which an applicant who submits his application and required records early in the period set aside for processing applications for admission to a specific fall quarter will receive notification of his eligibility within a correspondingly early period.

*High School Seniors* who wish to enter the fall quarter are encouraged to submit their applications for admission at the earliest possible date in the senior year. (See *Admissions Procedures*.) By so doing, the prospective Chicago Circle freshman will have an opportunity to participate in advance enrollment during the spring and summer months prior to fall enrollment. The deadline for submission of completed\* applications is September 1 or until capacity is reached, whichever occurs first, and action is taken on individual applications in the order in which they are completed.

Because capacities have been rapidly increased, the enrollment of beginning freshmen at Chicago Circle has risen steadily, and no reduction is anticipated in the immediate future. However, if it is necessary to limit admission approvals for any given quarter, the Program of Progressive Admission will be activated. Under this program, admission priority is given to those students who demonstrate high scholastic ability. A combination of test score and rank in class forms the selection index for beginning freshmen.

\*A completed beginning-freshman application is one for which all official high school transcripts and test scores are on file in the Office of Admissions and Records.

*Transfer-Student Applicants and Former-Student Applicants* whose applications and all supporting credentials are on file well in advance of the quarter for which admission is sought will benefit by receiving earlier notification of admissibility, under the Rolling Admissions Program. (See *Admission Procedures*.)

If it becomes necessary to limit admission at either the lower division (under 90 quarter or 60 semester hours) or upper division (90 and above quarter hours or 60 and above semester hours), admission priority will be granted in the order of scholastic excellence, in accordance with the Program for Progressive Admission, to as many applicants as capacities allow. For new transfer students and former University of Illinois students seeking readmission, the cumulative average for all previous collegiate work is the index.

## Admission with Advanced Standing

Advanced standing consists of college-level credit acceptable to the University. The application of such credit toward a degree, however, is at the discretion of the dean of the college offering the degree.

## Credit From Other Institutions

*Fully Accredited Institutions.* Work successfully completed in other fully accredited institutions (either those approved by one of the regional accrediting associations or those approved by one of the agencies recognized by the National Commission on Accrediting) is generally accepted by the University on an hour-for-hour basis, as shown on the official transcripts received from those institutions. For consistency, credit in semester hours is converted to credit in quarter hours.

*Provisionally Accredited Institutions.* Work completed in a provisionally accredited institution is accepted only on a *deferred* basis. To receive such transfer credit, a student must earn at least a 3.000 (C) average (or higher if prescribed by the curriculum the applicant wishes to enter) within the first 18 to 45 quarter hours of work in residence at the University of Illinois or in another fully accredited collegiate institution. If the student fails to validate his transferred credit within the validation period, he then must pass proficiency examinations if he is to receive credit for his work at the provisionally accredited institution.

*Unaccredited Institutions.* Credit from unaccredited institutions is not accepted. However, credit in courses taken in such institutions may be established by proficiency examinations. See *Proficiency Examinations for Enrolled Students*.

*Junior College Credit.* The foregoing conditions governing acceptance of credit also apply to credit from junior college. Credit transferred from a junior college is limited only by the provision that a student, after attaining junior standing, must earn at least 90 quarter hours required for the degree at the University of Illinois or at any other approved four-year institution provided that the student meets the residence requirements for a degree from the University of Illinois. When a school or college requires three years of preprofessional college credit for admission, at least the last 45 quarter hours of preprofessional credit must be taken in an approved four-year collegiate institution.

*Transferred Credits.* Effective September 1970, admission of transfer students to the University of Illinois will be based only on course work that prepares students to continue work for a baccalaureate degree. Technical courses comparable in content and level to courses offered at the University of Illinois will be evaluated for admission only at the request of the college submitting the transcript and upon recommendation of the dean of the college at Chicago Circle to which the student seeks admission.

## Credit for Military Service

Completion of not less than six months of extended active duty in any



branch of the armed forces of the United States entitles an applicant to six quarter hours of credit in physical education and six quarter hours in basic military science if the applicant has been honorably separated.

Credit is also allowed for those United States Armed Forces Institute (USAFI) courses for which the American Council on Education recommends credit at the baccalaureate level, provided the student has passed the appropriate USAFI end-of-course test or examination.

Credit for service schools successfully completed and for other courses taken while the student was in service may be allowed after evaluation by the Office of Admissions and Records.

No credit is allowed for the college-level General Educational Development Tests.

## Credit Through the Advanced Placement Program

This program, administered by the College Entrance Examination Board, is designed for those high school students about to enter college who wish to demonstrate their readiness for courses more advanced than those ordinarily studied during the freshman year. College credit is awarded to those students who earn sufficiently high grades on the examinations covering basic freshman-course subject matter. Many high schools offer advanced classes in one or more of the following subjects: English, French, German, Latin, Spanish, American history, European history, biology, chemistry, mathematics, and physics. The University encourages able high school students to enroll in these courses and to write the examinations in each of the foregoing subjects. The examinations are prepared by joint national committees of high school and college teachers and are administered by the Educational Testing Service. The examinations, graded by other national committees, have the following values: 5—high honors, 4—honors, 3—creditable, 2—pass, 1—fail.

*Note:* Transfer students may be granted credit on the basis of Advanced Placement Examinations *only* by having official copies of grades in those examinations submitted to the Office of Admissions and Records. Awarding of credit will be determined in accordance with the policies in effect at the time the official grades are received.

The University of Illinois at Chicago Circle makes these specific credit recommendations:

### Humanities

#### *English*

1. Grades of 5 and 4: 12 quarter hours of credit in English 101, 102, 103.
2. Grade of 3: Referred to the department.
3. Grade of 2: No credit.

#### *French*

1. Grades of 5, 4 and 3: 8 quarter hours of credit at the lower-division level.



2. Grade of 2: Referred to the department.

#### *German*

1. Grades of 5, 4 and 3: 8 quarter hours of credit at the lower-division level.
2. Grade of 2: Referred to the department.

#### *Latin 4*

1. Grades of 5, 4 and 3: 4 quarter hours of credit at the lower-division level.
2. Grade of 2: Referred to the department.

#### *Latin 5*

1. Grades of 5, 4 and 3: 8 quarter hours of credit at the lower-division level.
2. Grade of 2: Referred to the department.

#### *Spanish*

1. Grades of 5, 4, and 3: 8 quarter hours of credit at the lower-division level.
2. Grade of 2: Referred to the department.

*Note:* French, German, Latin and Spanish papers do not carry automatic credit in a particular foreign language course. Hence, the student, in consultation with the appropriate department may select the course for which he is best qualified. When such selection has been determined, credit, up to a maximum of 8 hours, will be granted in courses preparatory for that in which the student has been placed.

### **Social Studies**

#### *American History*

1. Grades of 5 and 4: Credit for History 151, 152, 153. (12 quarter hours)
2. Grades of 3 and 2: No credit.

#### *European History*

1. Grades of 5 and 4: Credit for History 111, 112, 113. (12 quarter hours)
2. Grades of 3 and 2: No credit.

### **Natural Sciences and Mathematics**

#### *Biology*

1. Grades of 5, 4, and 3: Credit for Biological Sciences 100, 101, 102. (12 quarter hours)
2. Grade of 2: No credit.

#### *Chemistry*

1. Grades of 5 and 4: Credit for three quarters of general chemistry (12 quarter hours) and permission to enroll in Chemistry 121.
2. Grade of 3: Credit for two quarters of general chemistry (8 quarter hours) and permission to enroll in Chemistry 114. Each student may take a proficiency examination in Chemistry 114 immediately after enrolling. If he passes, he is given credit in that course also and is permitted to register in the next chemistry course in sequence.

*Mathematics*

1. Grade of 5 on the AB or BC examination: Credit in Mathematics 130, 131, 132, 133 (20 quarter hours) and advanced placement in any course for which Mathematics 133 is a prerequisite.
2. Grade of 4 on the AB or BC examination: Credit in Mathematics 130, 131, 132 (15 quarter hours) and advanced placement in Mathematics 133.
3. Grade of 3 on the AB or BC examination: Credit in Mathematics 130, 131 (10 quarter hours) and advanced placement in Mathematics 132.
4. Grade of 2 on BC examination: Credit in Mathematics 130 (5 quarter hours) and advanced placement in Mathematics 131.
5. Grade of 2 on the AB examination: Students in this category are invited to take a proficiency examination in Mathematics 130. Passing of this examination will give 5 quarter hours of credit in Mathematics 130 and advanced placement in Mathematics 131.

*Physics*

1. Grades of 5 and 4: Credit in Physics 111 (4 quarter hours) or Physics 101 (5 quarter hours), depending on the student's curriculum.
2. Grade of 3: Automatic admission to a proficiency examination that covers Physics 111, 112, 113, and 114 or Physics 101, 102, and 103, depending on the student's curriculum. Grades of A or B on the proficiency examination on the first sequence carry 19 quarter hours of credit; on the second sequence, 15 quarter hours of credit. Grades of C: Consult the Department of Physics.
3. Grade of 2: With the approval of the Department of Physics, students may write a proficiency examination in any one of the courses in the sequences listed in paragraph 2. Credit will be allowed only for those courses in which the student has proficiency examination grades of C or higher.

## **Credit Earned Through the American College Test**

Students whose American College Test subscore in English is 27 or higher will be given 4 hours of credit in Rhetoric 101. Those whose American College Test subscore in English is 25 or 26 may register for the honors sequence in Rhetoric 101 and 102. No comparable provisions exist for the other subscores on the ACT.

## **Credit Earned Through the Talented Student Program**

Such credit is entered on the student's permanent University record. If he is admitted as a regular student after high school graduation, he is given advanced placement in those subjects in which he earned credit. See *Talented Student Program for Illinois High School Seniors*.

## Admission Procedures

*Application Fee.* All applicants for admission to the fall quarter 1970 and thereafter pay a nonrefundable application fee of \$15 to be enclosed with the application sent directly to the Office of Business Affairs in the official envelope provided with the application blank. Applications mailed directly to the Admissions Office and applications not including the fee will be returned to the applicant. The Office of Business Affairs retains only the nonrefundable fee and forwards the application and all official transcripts and other records to the Office of Admissions and Records.

An undergraduate applicant falls into one of three major admission categories: beginning freshman, transfer student, or readmission applicant. The specific steps to be completed by the applicants in each category follow. Application blanks may be obtained by mail, telephone, or in person from the Office of Admissions and Records, University of Illinois at Chicago Circle, Box 4348, Chicago, Illinois 60680.

*Preadmission Counseling.* Admissions and Records also maintains a pre-admission counseling service, which is available to all prospective students. An appointment is not required, and inquiries are welcome during the normal working day, Monday through Friday. Members of this section also visit high schools and junior colleges in the Chicago area to explain fully the admission requirements and procedures. They will also, on request, arrange for high school students and counselors to come to the campus for group discussions and tours.

*Beginning-Freshman Applicants.* High school seniors who wish to enter a fall quarter are encouraged to submit their applications for admission as early as possible after September 25 of their senior year. The completed application and a check or money order for \$15 made out to the University of Illinois should be submitted to the high school principal with the request that they be mailed in the appropriate envelope to the Office of Business Affairs together with an official transcript of the high school, which should include:

*For the student in the seventh semester (first semester of the senior year):* grades for the first three years, rank in class at the end of the sixth semester, courses in progress during the seventh semester, and courses planned for the eighth semester (or a statement that those in the seventh will continue through the eighth semester), and the probable date of graduation.

*For the student in the final semester of his senior year:* grades for the first seven semesters, rank in class at the end of the seventh semester, courses in progress, and the probable date of graduation.

A student who has been graduated from high school but has not completed a sufficient number of college credit hours to be classified as a

transfer student<sup>1</sup> should submit the complete application and a check or money order for \$15 made out to the University of Illinois to his high school principal with a request that they be mailed directly to the Office of Admissions and Records *together with* a final transcript of his high school records, including a statement of his scholastic rank when he was graduated.

<sup>1</sup>An applicant, who, as defined above, is a beginning freshman but has completed some college work must have a final transcript of that work forwarded to the Office of Admissions and Records. If he is currently enrolled at an accredited college or university at the time his application is submitted, he must request the institution he is attending to send to the Office of Admissions and Records a transcript indicating his courses in progress.

Beginning Freshman applicants who wish to enter a quarter other than the fall quarter must follow the foregoing procedures. Deadlines for receipt of such applications are as follows:

Quarter	Applications Accepted on and after:	Recommended Deadline <sup>2</sup>
Fall	September 25 of previous Year	August 1
Winter	October 1	December 1
Spring	December 1	March 1
Summer	March 1	June 1
Summer (see <i>Admission to the Summer Quarter Only</i> )		

Students in all the foregoing categories must have their official scores on the tests administered by the American College Testing Program (ACT) sent to the Office of Admissions and Records. Information about where and when to take the ACT may be obtained from the high school counselor or by writing the ACT Registration, P.O. Box 414, Iowa City, Iowa 52240. If the applicant has completed this test but did not request that the scores be sent to the Office of Admissions and Records at Chicago Circle, he should send \$2 (two dollars) to the Records Department, American College Testing Program, P.O. Box 451, Iowa City, Iowa 52240, together with a request that a copy of the scores be mailed to the Office of Admissions and Records. An applicant who has not taken the ACT but has taken the Scholastic Aptitude Test (SAT) of the College Entrance Examination Board should have his official scores submitted to the same office; he will be considered for admission on the basis of those scores. If either the ACT or the SAT is taken more than once, the highest score reported is used to determine the scholastic index.

The University of Illinois urges prospective entering freshmen to take one or the other of the tests in the latter part of the junior year in high school, or as soon thereafter as possible.

<sup>2</sup>Date by which application and all required records should have been received to permit consideration for the term indicated. Admission consideration will cease if capacities are reached prior to the recommended deadline.

*Transfer Applicants.* If a transfer applicant (see *A Transfer-Student Applicant*) is not presently enrolled in college, he should mail his applica-



tion in the appropriate envelope addressed to the Office of Business Affairs. At the same time, he should request his high school principal and the registrar of each collegiate institution he has attended to send official transcripts to the Office of Admissions and Records. See *Rolling Admissions Program*.

If the applicant is enrolled in college at the time he submits an application, he should comply with the directions above and, during the last term in which he is enrolled in his current college, request that the transcript from that institution include a list of the courses he is taking. His cumulative grade-point average may make it necessary to delay final decision on his application until he has completed work at the institution from which he plans to transfer.

Deadlines for receipt of transfer applications are as follows:

Quarter	Applications accepted on and after.	Recommended Deadline*
Fall	February 1	August 1
Winter	October 1	December 1
Spring	December 1	March 1
Summer (See <i>Admission to the Summer Quarter Only</i> )	March 1	June 1

\*Date by which application and *all* required records should have been received to permit consideration for the term indicated. Admission consideration will cease if capacities are reached prior to the recommended deadline.

*Readmission Applicants.* If an applicant has previously attended one or more campuses of the University of Illinois, he must indicate on his application the campus or campuses on which he was registered: Chicago Circle (including its predecessor at Navy Pier), the Medical Center at Chicago, or the Urbana-Champaign Campus. If his last University attendance was at either Navy Pier or Chicago Circle, he submits only those transcripts for work completed since the University of Illinois attendance. However, a student who wishes to transfer to Chicago Circle from the other campuses is subject to the same procedures required of applicants for transfer from other collegiate institutions. See *Transfer-Student Applicants* above.

Students who request transfer from one campus to another or request readmission to the campus previously attended are subject to the same application-fee and advance-deposit regulations and to the same procedures that apply to other applicants.

The dates suggested for submitting readmission applications and credentials are the same as those for transfer applicants.

*Note:* A student whose *only* previous registration at the University of Illinois was in correspondence or extramural courses or as a nondegree candidate summer-quarter-only registrant must present complete records of all scholastic work, both high school and collegiate, as outlined above for new students, and must meet the admission requirements of his chosen college and curriculum if he is to be considered for admission.



*Foreign-Student Applicants.* Applicants from outside the United States of America should request from the Office of Admissions and Records an Application for Admission for Applicants in Other Countries. The application, original or certified copies of education credentials, and a check or money order for \$15 (nonrefundable application fee) should be sent to the Office of Business Affairs in the special envelope provided.

All credentials for foreign-student applicants must include all secondary and post-secondary level studies completed to date, grades or examination results received (both failing and passing), maximum and minimum grades obtainable, rank in class, degrees, diplomas, certificates earned, and length of the school year. Original documents in languages other than English must be accompanied by official English translations.

Applicants whose native language is not English will be required to take an English proficiency test, even though the foreign instruction was in English. The proficiency test prescribed is the Test of English as a Foreign Language (TOEFL), and arrangements usually can be made to take it in the country in which the applicant lives. If that is not possible, arrangements may be made by writing to the Educational Testing Service (ETS), Box 592, Princeton, New Jersey, 08540. TOEFL is not required for students from *countries* where English is the native language.

If the foreign applicant is admissible, his performance on the English test will either (1) excuse him from further study of English, or (2) indicate the need for additional study of English. In the latter event, he is required to take a placement test administered by the Coordinator for Foreign Student Affairs prior to his registration. The results of the Placement Test determine whether or not the student is required to register for one or more non-credit courses in English. If so, his program of credit courses is reduced accordingly, and a longer time may be necessary for completion of his degree requirements.

## Selection of College and Curriculum

A beginning-freshman applicant who is in doubt about the courses of study he should pursue may secure help in reaching a decision by attending the guidance program of the University. The Student Counseling Service offers Freshman Guidance Examinations to second-semester high school seniors and to high school graduates. Applicants are strongly urged to take these examinations; information will be sent to all beginning freshman applicants by the Office of Admissions and Records. After he completes the examinations and submits his ACT scores, the applicant will receive an appointment from the Student Counseling Service, which offers professional counseling.

Applicants should not delay submission of the application until after the consultation with the Student Counseling Service; if, as a result of counseling, the applicant wishes to change the college and curriculum he had previously designated, he may make written request to the Office of Admissions and Records.

## Additional Records

If, in individual cases, records in addition to those listed for prospective beginning freshmen, transfer, and readmission applicants are needed, the applicant will be notified by the Office of Admissions and Records. Such records may include a recommendation from a college dean, an Illinois residence clarification, name clarification, approval for admission to specific programs, or other documents.

An applicant who has served on active duty in the armed forces of the United States *must* submit a photocopy of his service-separation papers.

## Tuition-and-Fee Deposit

When the notice of eligibility for admission or readmission is mailed to an applicant, it is accompanied by a request for payment of a *nonrefundable* tuition-and-fee deposit of \$30 which is applied toward his first tuition assessment. The request for payment carries a deadline by which the deposit must be sent. Failure to make payment by the specified deadline will be construed as meaning the student no longer wishes to be considered for admission to that quarter.

*Exception:* The deposit is not required if an applicant indicates on his deposit card that he intends to register for less than 12 hours or that he is a member of the nonacademic staff of the University of Illinois.

## Permit to Enter

After he pays his tuition-and-fee deposit, a student is sent either a Permit to Enter or a Notice of Readmission, as appropriate. These documents are statements of confirmation of reserved space in the college and curriculum he desires and a description of any advanced standing allowed him on admission or readmission. Also enclosed are the instructions he must follow to complete his registration.

## Registration Procedures

*Registration* is the act of enrolling in an approved program of courses after a new student has been granted a Permit to Enter. Registration includes:

1. Course placement tests. (Not required of readmitted students.)
2. A medical examination. (Not required of readmitted students.)
3. Program advisement and approval.
4. Payment of tuition and fees.

Until the student has completed the medical examination and placement tests (if applicable), attended his academic advisement and program-request conferences, and paid his tuition and fees, he is not fully registered in the quarter to which he has been admitted.

*A Program* consists of the courses and sections in which a student is currently registered. Registration is *not* complete until all fees have been paid or until arrangements have been made with the Business Office for the student to use the deferred-fee plan.

*Off-Quarter Vacations.* A student may elect to attend any three quarters in one calendar year. If he chooses to use a quarter *other than the summer* as his vacation, or Off Quarter, he must file an application with the Office of Admissions and Records before the first day of instruction of the quarter he wishes to use as vacation. Application blanks for the purpose are available in that office. If the vacation quarter is other than the summer quarter, the student must attend the summer quarter of that calendar year if he wishes to retain his status as a continuing student.

## **The Medical Examination**

All new students are required to take a medical examination prescribed by the University Health Service. This examination must be administered by the student's own physician at the student's expense. Instructions and the required forms are mailed by the University after admission approval.

After the medical examination is completed and the forms are returned to the Health Service, the student will be sent a receipt, which he must bring to this advisement and registration conference.

## **The Placement Tests**

Required of most students registering for the first time in the University of Illinois, these tests determine course placement and are not taken until after an applicant receives his permit to enter. Instructions about the tests are clearly stated in the material enclosed with the Permit. A new student must ascertain from these instructions whether he must take the placement tests in foreign language, mathematics, and chemistry, since all tests are not required of all students.

## **Academic Advising and Program-Request Conference**

All new and former students who have been granted admission or read-

mission to a fall quarter are scheduled for conferences at which they are advised by representatives of the several college offices. Subsequently, students are assigned to program-request conferences, during which they make final course and section selection and pay the balance due on tuition and fees.

*Residual Registration*, conducted for each quarter in the week prior to the beginning of instruction.

Fall quarter—for students admitted too late to be scheduled for the summer conferences noted above.

Winter, spring and summer quarters—for all students granted admission or readmission to those quarters.

During residual registration a student meets with an adviser from the college to which he has been admitted. Together, they plan the student's program for the ensuing quarter.

## Tuition and Fees

Tuition and some fees are assessed all students and are payable in full as part of registration. Under certain circumstances arrangements may be made with the Business Office to defer payment. The amount of the tuition and the service fee varies with number of credit hours for which the student registers and subsequent change in the number of hours carried could result in a change in those amounts. Tuition (but not the service fee) also varies according to the Illinois resident or nonresident status of the student.

### Tuition and Fees—Chicago Circle (Subject to Change)

Per Quarter	Range I 10.5 quarter hours and above		Range II 5.5 through 10 quarter hours		Range III 0 through 5 quarter hours	
	Res.	Nonres. <sup>1</sup>	Res.	Nonres. <sup>1</sup>	Res.	Nonres. <sup>1</sup>
<sup>2</sup> Tuition (except those holding exemptions) . . . .	\$82	\$318	\$58	\$220	\$34	\$124
<sup>3</sup> Service Fee . . . . .	32	32	24	24	14	14
Hospital-Medical-Surgical Insurance Fee . . . . .	7	7	7	7	7	7
Total . . . . .	\$121	\$357	\$89	\$251	\$55	\$145

<sup>1</sup>See Residence Classification.

<sup>2</sup>Effective September 1, 1970.

<sup>3</sup>The Service Fee is used to cover the operating expense of Chicago Circle Center, the Financing of the Center building, and the cost of the Student Activities Program.

*Tuition for "Zero-Credit" Courses.* Students taking one or more courses for zero credit, but no courses for credit, will be assessed for tuition and fees as follows:

*a. For study on-campus:* One-half of the Range III resident tuition and one-half of the Range III service fee, each rounded to the next higher even dollar, and the full hospital-medical-surgical fee. (No charge will be assessed, however, for University employees who register, at the request of their department, only in zero-credit courses especially established to improve the work of the employee.)

*b. For study off-campus,* including graduate registration "in absentia": One-half of the Range III resident tuition, rounded to the next higher even dollar, but no service fee and no hospital-medical-surgical fee.

Students simultaneously taking one or more courses for zero-credit and one or more courses for credit will be assessed for tuition and fees on the basis of the credit course(s) only.

## The Hospital-Medical-Surgical Insurance Fee

This fee is the same for all students, regardless of the number of hours for which they are enrolled or of their Illinois residence status. However, if a student presents evidence of insurance in force which provides him equivalent coverage, he may petition the University Insurance Office for a refund of his fee. Refunds are not made on any other basis. The student also must consult the Insurance Office about the time limit for such a refund petition. If a student withdraws from the University, he does not receive a refund, since he remains insured for the balance of the quarter from which he withdrew. See *Hospital-Medical-Surgical Insurance*.

## Additional Fees and Charges

One or more of the following additional fees and/or charges will be assessed as applicable.

*The Course-Visitor Fee* of \$15 is assessed all class visitors who are not in Range I in the tuition-and-fee schedule. See *Visitors*.

*The Special-Examination Fee* of \$10 is assessed for a special examination taken in the hope of obtaining credit in a course that has been failed at the University of Illinois. See *Student Handbook* (University of Illinois at Chicago Circle).

*The Transcript Fee* of \$1 is assessed for each additional transcript sent after the first, which is issued without charge.



*The Late-Registration Fine* of \$15 is levied against all students who complete registration after classes have begun.

*The Lost-Photo-Identification-Card Fee* of \$1 is assessed for replacing a lost or destroyed identification card, initially issued to the student at the time of registration. The card is used to obtain library books, lockers, towels, and other equipment.

*The-Deferred-Fee Charge* of \$2 is imposed when arrangements have been made with the Business Office to defer payment of fees. The charge must be paid on the day the agreement is reached and is nonrefundable.

*The Change-of-Program Fee* of \$1 is levied for each change-of-program slip issued at the request of the student after classes have begun unless it is waived by the dean of the student's college. They are not official, however, until final papers are deposited with the Records Department of the Office of Admissions and Records.

## Refunds

Students who withdraw from the University or from a course are, under certain circumstances, entitled to a refund of a portion of the tuition and fees paid. All requests for withdrawals should be initiated in the office of the college in which the student is enrolled.

*Refunds on Withdrawal from the University.* The student who withdraws *within the first ten days of instruction* is entitled to a refund of the full amount of tuition and fees, *except for the \$31 nonrefundable service charge*. After the tenth day of instruction and before the middle of the quarter, one half of the amount assessed is refunded, *except for the nonrefundable charge*. The calendar in the quarterly Timetables indicates the dates on which the above regulations are effective.

No refund is issued after midquarter.

No refund is issued if the total assessment was less than \$31 (for example, a student on a tuition-waiver scholarship).

*Refund on Withdrawal from a Course.* If withdrawal from a course results in a reduction in the student's program to a lower tuition-and-fee range, the full difference is refunded during the full-rebate period; half the amount of the difference is refunded when withdrawal occurs during the half-rebate period; no refund is made if withdrawal occurs thereafter.

*Refund on Withdrawal by a Visitor.* A full refund will be issued if the withdrawal is made *within ten days after payment of fee*. Thereafter, no refund will be made.

*Refund on Withdrawal to Enter Military Service.* When a student withdraws from the University to enter military service, he must be on active duty within ten days after withdrawal if he is to benefit from the rules stated below; *it is his responsibility* to present proof of his active-duty status. The most effective way of presenting such proof is to have the personnel officer of the unit to which he is assigned certify to the University the date of the student's assignment to active duty.

If withdrawal occurs during the first five weeks of instruction, the student is entitled to a full refund of his tuition and fees, less the Hospital-Medical-Surgical Insurance fee.

If withdrawal occurs during the sixth to eighth week (inclusive) of instruction, the student will receive one half refund of his tuition and fees, less the Hospital-Medical-Surgical Insurance fee.

No refund of tuition and fees is made after the eighth week, but full credit is allowed for all courses in which the student has a grade of C or higher and a W, withdrawn without penalty, is recorded for courses in which his grade is below C.

For additional credit information for the student who enters military service, see *Transfer and Withdrawal*.



# Student Affairs

OSCAR MILLER, M.A., Dean of Student Affairs  
WEYMAN L. EDWARDS, M.Sc., Assistant Dean of Student Affairs  
WARREN O. BROWN, B.S., Dean of Men  
RONALD BROWN, B.A., Assistant Dean  
AGNES G. TANDBERG, M.A., Dean of Women  
BARBARA C. ROY, M.Ed., Assistant Dean  
ARTHUR J. FALLS, B.S., Director of Financial Aid  
PHILLIP G. BAUGHER, B.A., Coordinator of Student Employment  
SUSAN M. ROCCO, B.A., Assistant Coordinator of Student Employment  
CONSTANCE WILSON, M.A., Coordinator of Loans  
MARIKO N. GALLAGA, B.A., Coordinator of Scholarships and Grants  
LAURETTE A. KIRSTEIN, M.S., Coordinator of Foreign Student Affairs  
JAMES A. LITTRELL, JR., M. Th., Assistant Coordinator of Foreign Affairs  
JOHN E. KYSAR, M.D., Director of Health Services  
DANIEL J. MCCARTHY, M.D., Assistant Medical Director  
ROLAND SWAIM, Ed.D., Coordinator of Placement Services  
RICHARD G. BICKHAUS, Ed.Sp., Assistant Coordinator of Placement Services  
HAROLD KLEHR, Ph.D., Director of Student Counseling  
HAROLD F. RODMAN, M.Ed., Director of the Office of Organizations and Activities  
SUSAN S. ERSKINE, M.A., Assistant Director of the Office of Organizations and Activities

The academic life of the student is supervised by the dean of the college in which the student enrolls; however, the University's interest in the individual extends beyond the classroom to include his personal welfare and his orientation to college life.

## **The Dean of Student Affairs**

The Dean of Student Affairs is a major officer of the University. He reports directly to the Chancellor and helps in the formulation of policy that governs student affairs; he also works closely with other members of the administrative staff, with Student Government and other student organizations, and with the faculty Senate Committee on Student Affairs. His office is responsible for coordinating the activities and functions performed by the Offices of the Dean of Men, the Dean of Women, Financial Aid and Student Employment, Foreign Student Affairs, Organizations and Activities, Placement, Student Counseling, and Student Health Services. The Office of the Dean of Student Affairs along with the offices listed above, should be regarded as the principal point of contact between the individual student, the student organizations, and the University Administration. Problems faced by students in their adjustment to the University, including their relationships to each other, to extracurricular activities, to their college offices, to the University police, or to other administrative agencies may be brought to this or to any of the above offices for help in their resolution.

## **Academic and Other Regulations**

The student should familiarize himself very early with the University and with the customs and policies of this campus. Each incoming student receives a copy of the *Student Handbook*, which provides information about the University. The student has a personal obligation to be familiar with its contents.

## **The Dean of Men and the Dean of Women**

These officers and their staffs are available daily for conferences with students or with their parents. The Dean of Men and the Dean of Women also work closely with various student activities and organizations from their offices on the eighth floor of University Hall.

## **The Student Counseling Service**

By providing personal counseling, specialized group services, and psychological testing, the Student Counseling Service aims to foster the educational, vocational, and personal development of the student so that he may attain maximum benefits from his educational experiences. It is the privilege of the student to make use of the following services whenever the need arises.



*Educational, Vocational, and Personal Counseling* are available to any student who may be uncertain about his choice of college or major or who needs help in choosing an occupation or who is concerned with personal problems.

*Group Services* are provided for the student who wishes to improve his reading comprehension and speed, who wants to establish better study methods, who needs help in planning a career, or who wishes to develop his interpersonal skills.

*Freshman Guidance Examinations*, followed by a counseling appointment, are offered to all graduating high school seniors who have completed the American College Test (ACT) or the Scholastic Aptitude Test (SAT), one of which is required of applicants for admission to the University. This service, which is provided to Illinois residents, has no bearing on the applicant's eligibility for admission.

*Pre-Entry Counseling* is offered to the graduating high school senior or to the transfer student to help him determine the college and the curriculum of the University that best meet his needs, to formulate his educational and vocational goals, and to clarify his thinking on how to make a good start in his college work.

*Individual and Group Tests* are offered to registered students in support of educational, vocational, and personal counseling. In addition, the student interested in taking various national examinations for admission to graduate and professional colleges may wish to consult with the Student Counseling Service.

*The Speech and Hearing Clinic*, under the auspices of the Student Counseling Service, provides, free of charge, facilities for hearing testing, diagnostic speech and voice evaluations, and correction of speech problems. Students who wish assistance in correcting speech difficulties, including those arising from foreign accents, hearing impairments, and voice or articulation problems should avail themselves of the services of this clinic, located in 202 Grant Hall.

## **The University Health Service**

Better physical and mental health for the students at Chicago Circle is the goal of Health Service doctors, who are experienced clinicians; most of them have practiced for years as family physicians or as specialists.

Medical examinations are required of all students before their first registration. The examination is made by the family physician at the student's expense.

Beds for the temporary day care of ill students are provided. The

University does not provide hospital care for its students, the large majority of whom are from families living in the Chicago area; hence, cases requiring bed care are referred to the student's family doctor and to hospitals of the community.

The University provides clinic services for both preventive medicine and treatment. The cost of most medical expenses that cannot be assumed by the Health Service is covered by the student Hospital-Medical-Surgical Insurance, supervised by the Insurance Division of the Business Office, at a cost to the student of \$7 per quarter.

## Financial Aid

Scholarships of various types, grants, loans, and employment are the main areas of financial aid for undergraduates. Loans and employment are also available to graduate students. For additional information, see the Graduate College Catalog. A student will receive an application for financial aid if he checks the box in Section 15 of the Application for Admission to the University.

## Scholarships

Scholarships at the University of Illinois are limited in number and are awarded to the best qualified applicants. Each scholarship may have specific restrictions; nearly all require:

1. A superior scholastic record.
2. Evidence of financial need.

Financial need is evaluated from the completed Parents' Confidential Statement, to be filed with the College Scholarship Service by February 15. Forms and information can be obtained from high school counselors or from the College Scholarship Service, Box 881, Evanston, Illinois.

Most scholarships are awarded in late spring or early summer for the following school year. Incoming freshmen should apply for fall-quarter awards early in the senior year of high school. A student currently enrolled in the University of Illinois may file an application if his scholastic average is 3.750 or higher.

*University Scholarships.* Most University of Illinois scholarships are restricted to Illinois residents, since the University is a state-supported institution. However, the University does have some scholarship funds for out-of-state students.

A few scholarship awards are made in cash, but for the most part scholarships exempt the recipient from the payment of tuition and, in certain cases, fees. Most annual scholarships are renewed if the student maintains the required scholastic average and continues to demonstrate financial need.

An entering freshman who is awarded a University scholarship must rank at least in the top quarter of his high school class and must demonstrate financial need. Past records indicate the average freshman scholarship winner ranked in the upper 10 percent of his high school class.

*Military Scholarships.* Any veteran who meets University admission requirements is scholastically qualified for a Military Scholarship. The Illinois Military Scholarship may be used concurrently with a United States government grant-in-aid scholarship or an NDSL loan.

Students who are eligible for the Illinois State Military Scholarship are entitled to receive benefits from both the G.I. Bill and the scholarship. If your Military Scholarship has expired, however, you are *not* eligible to reapply for it. The following is a summary of the requirements for the Military Scholarship:

### **Residence Requirement**

The applicant must have been a resident of the State at the time he entered active service or must have been a bona fide resident of the State until at least 6 months prior to entering active service and upon leaving the service must have returned to the State within 6 months and must have resided in the State for not less than one year immediately prior to the date of his application.

### **Length of Active Service**

The applicant must have been on active duty for *not less than one year* unless he received an honorable discharge for medical reasons directly connected with such service.

### **Termination of Scholarship**

An Illinois State Military Scholarship will automatically terminate four consecutive calendar years after the effective beginning date unless extension has been granted because of illness, the need to earn funds for schooling, or re-entry into active service.

Additional requirements are under consideration and may be imposed by the Illinois State Scholarship Commission.

*Work Scholarships for Superior Students.* Each year the Financial Aid Committee, under authority from the Board of Trustees, selects worthy students for the Work Scholarship Program. A Work Scholarship exempts the student from payment of tuition each quarter and requires an average of ten to twelve hours of work per week, which makes it possible for him to earn money for most of his other college expenses. Information about Work Scholarships may be obtained from the Office of the Director of Financial Aid.

## Illinois State Grants

Under legislation passed by the General Assembly, the Illinois State Scholarship Commission administers a greatly expanded program of grants to pay the cost of tuition and fees at all approved colleges and universities in the state.

A student who was not awarded an Illinois State scholarship, either honorary or monetary, may apply for a grant. Applicants entering college for the first time should apply through the high school counselor; prospective transfer students and junior college graduates secure forms from the financial aid office of the school they are currently attending in Illinois or through the University of Illinois at Chicago Circle Office of Financial Aid.

Continuing students at the University of Illinois at Chicago Circle may secure Illinois State Grant application forms from the Financial Aid Office, Eighth Floor, University Hall, after December 1.

*Students enrolled at Chicago Circle are reminded that if they wish to be considered for all types of funds available under financial aid, two separate and distinct financial statements must be filed:* The University requires that a Parents' Confidential Statement be sent to the College Scholarship Service, Box 881, Evanston, Illinois; the Illinois State Scholarship Commission requires its own financial statement *in addition* to the foregoing. Forms are not interchangeable, although the same information is requested on both. *The deadline for applications is February 15 for the following academic year (September through June).*

## Educational Opportunity Grants

The University of Illinois at Chicago Circle, in cooperation with the federal government, is administering the Educational Opportunity Grants authorized under the Higher Education Act of 1965.

The basic purpose of the Educational Opportunity Grant Program is to assist students who have exceptional financial need, and who, for lack of financial means of their own or of their family, would not be able to enter or remain in college without such a grant.

An Educational Opportunity Grant may be awarded to the student who meets the following basic eligibility criteria:

1. He must be a citizen of the United States or must be in the United States permanently and must intend to become a citizen.
2. He must show evidence of academic or creative promise and must be capable of making satisfactory progress.
3. He must be accepted for enrollment or be enrolled in a full-time undergraduate course of study and must continue to be a full-time student while receiving the grant. Twelve hours per quarter is considered full time.

4. He must be willing to accept an equal amount of financial aid, which will serve as the matching portion of the grant..
5. His family's income should not exceed \$6,000 gross per year.

Applications for Educational Opportunity Grants should be made early in the senior year of high school. A student will receive an application for financial aid if he checks the box in Section 15A of the Application for Admission to the University. The grants will be awarded during the spring or summer to high school seniors who have been admitted for freshman registration for the fall quarter, as well as to currently enrolled students who will be returning to college in September, provided they have not completed more than seven (7) semesters or eleven (11) quarters (or the equivalent) of college-level work. Continuing students are also eligible for these grants. Applications may be obtained from the Office of Financial Aid.

A student's eligibility and grant stipends are determined by the expected contributions from the income and assets of his parents. Therefore, it is *required* that all students who wish to be considered for an Educational Opportunity Grant submit a Parents' Confidential Statement. These forms may be obtained from high school counselors or from the Office of Financial Aid.

The matching portion of the grant can be provided from one or more of the following sources: University scholarships and grants, tuition waivers, approved loans and employment programs; State scholarships or grants; scholarships or grants offered by corporations or service organizations (Rotary, Elks, P.T.A.). It is understood that the University of Illinois will approve and/or award all matching aid.

Educational Opportunity Grants range from a maximum of \$1,000 to a minimum of \$200 per academic year. An Educational Opportunity Grant can be renewed for the normal four-year period the student requires to complete his undergraduate study, but in no event can the grant exceed four academic years. A student will be eligible to renew his grant as long as he is making satisfactory progress as a full-time student and demonstrates continued financial need. If the student is in the upper half of his college class during the second year of the grant, an additional \$200 may be awarded as an incentive.

Married students and students independent of parents meet additional qualifications. Consult the Financial Aid brochures for details.

For information about additional financial aid contact:

The Office of Financial Aid  
816 University Hall  
The University of Illinois at Chicago Circle  
P.O. Box 4348  
Chicago, Illinois 60680  
Telephone: 663-3126



## Loan Funds

Because the number of scholarships is limited and many worthy students are unable to qualify for those available, other forms of financial aid are also provided at the University of Illinois to assist the student in financing his college education.

The National Defense Education Act of 1958 and the Higher Education Act of 1965 make available federal funds for loans to superior students. Applicants must be United States nationals. This includes citizens and all persons who are in the United States on a permanent-resident status. Borrowers are required to sign an oath of allegiance to the United States. In approving these loans, preference is given to applicants who express a desire to teach in elementary or secondary schools and to applicants whose academic background indicates a superior capacity or a preference for science, mathematics, engineering, or a modern foreign language. All applicants must present superior academic records; need for financial assistance must be shown. Students currently enrolled in the University of Illinois and progressing satisfactorily toward a degree may be eligible.

Loans are limited to \$1,000 each year (July 1 to June 30), with a maximum of \$5,000. The borrower must sign a promissory note. These federal loans carry 3 percent interest beginning nine consecutive months after the borrower ceases to be a full-time student, either by graduation or by withdrawal. A postponement of payments and a suspension of interest on the note, of not more than three years, may be arranged during the time the borrower is serving in the armed forces of the United States or in the Peace Corps. Those who teach full time in public elementary or secondary schools may have as much as 50 percent of the debt cancelled at the rate of 10 percent for each year of teaching. Also, if a borrower teaches in a so-called hardship, or culturally deprived area, he may have a loan cancelled at the rate of 15 percent to a maximum of 100 percent. In case of the death or permanent disability of the borrower, the loan and interest thereon may be cancelled.

### Financial Statement Requirement

Continuing demand for limited loan and scholarship funds dictates that priority must be established for all scholarships and National Defense and University long-term loans. In addition, all undergraduates must file a Parents' Confidential Statement for loan and/or scholarship or grant consideration. Independent students (those not claimed as a tax exemption by their parents for two years prior to filing for consideration) must file a student confidential statement and supply a notarized statement of nonsupport from parents.

*University Loans.* Both long-term and short-term loans are made to the student who can demonstrate need.

*Long-Term University Loans* are usually available to students who have completed, with a satisfactory record, a year or more at the University. The

maximum loan that an individual may have outstanding at one time is \$2,500.

Arrangements may be made to repay loans over a four-year period; payments begin four months after the student leaves school or otherwise ceases to be enrolled on a full-time basis. Security, in the form of a qualified endorser as a cosigner or evidence of collateral satisfactory to the Business Office, is required for all long-term loans unless otherwise provided in the deed or gift of the fund or by waiver in meritorious cases.

### Financial Statement Requirement for University Loans

Continuing demand for limited loan and scholarship funds dictates that priority must be established for all scholarships and National Defense and University long-term loans. In addition, *all undergraduates must file a Parents' Confidential Statement for loan and/or scholarship or grant consideration.* Independent students (those not claimed as a tax exemption by their parents for two years prior to filing for consideration) must file a student confidential statement and supply a notarized statement of nonsupport from parents.

*Illinois Guaranteed Loan Program.* The Illinois General Assembly has authorized an Illinois loan program to guarantee student loans made by commercial lenders.

An applicant must be a citizen, a bona fide resident of the State of Illinois, a person of integrity, and enrolled in a full-time program (12 quarter hours minimum).

An eligible student who has been accepted for enrollment in college may borrow from a minimum of \$300 to a maximum of \$1,000 for freshmen and \$1,500 for all other students, undergraduate and graduate. There is no age restriction; a minor is eligible to enter into a loan contract and to assume the responsibility for his own indebtedness. Repayment does not begin until the student either is graduated or ceases full-time study.

A list of the participating lending institutions is included with the application materials. Preferably, applicants should apply to a participating lending institution in or near his home community.

The maximum interest rate permitted by law is 7 percent simple interest, which begins on the date of the loan. If the family's annual adjusted income is less than \$15,000, the federal government pays all the interest while the student is in college and the student pays the principal and 7 percent interest during the repayment period. A student not qualified for a federal interest subsidy pays his own interest semiannually while he is in college.

Application forms and additional information about this program are available from participating lending institutions (banks, credit unions, and loan associations) in or near the student's home community or from the financial aid office of any college in the State of Illinois. Students who

are out of the state at the time they wish to apply for a loan may request application materials from:

Illinois Guaranteed Loan Program  
Box 33  
Deerfield, Illinois 60015

*Short-Term University Loans* may be requested by new students as well as by those already on campus. Loan amounts range to \$100 and must be repaid by the end of the quarter in which the loan is granted.

*United Student Aid Funds Program.* The University cooperates with banks throughout the nation to make student loans available under this program. Undergraduates may borrow up to \$1,000 a year; graduate students up to \$2,000 a year. A student may borrow a maximum of \$4,000 for his undergraduate and graduate programs.

Repayment begins five months after a borrower ceases to be a full-time student. He has a maximum of four years to repay the loan in monthly installments.

Applications for these loans are initiated and processed in the Financial Aid Office and are then forwarded to the student's bank or to his parents' bank. Applications are accepted throughout the school year.

*Emergency Aid (Small Loans).* A student in good standing and in immediate need because of an emergency may apply for aid in amounts up to \$15 by contacting the Dean of Men or the Dean of Women, who administer the Dean of Men and the Dean of Women Emergency Aid and the Faculty Women's Club Emergency Fund.

## **The Office of Student Employment**

Liaison between prospective employers and students desiring full, part-time, or seasonal employment is provided by this office. Placement through the Office includes all on-campus, off-campus, and work-study job opportunities. The job listings on file in the Job Center encompass a wide variety of jobs, wage rates, and schedules to meet student needs. Employment in special programs or projects for marketing, English, engineering, and science majors, to indicate a few, is also offered.

The Office of Student Employment, as a division of the Office of Financial Aid, administers the federal College Work-Study Program. A significant part of on-campus student employment, as well as some off-campus employment, is under the Work-Study Program. A student interested in employment generally, and in the Work-Study Program in particular, should contact the office four to six weeks before the date he will be available for employment. Completed financial aid forms are mandatory for all students participating in the Work-Study Program, and appointments are subject to yearly reconsideration and renewal.

Counseling for the Work-Study Program and for students with special employment problems is provided.

## **The Office of Organizations and Activities**

More than 85 recognized student organizations at Chicago Circle are assisted by this office in the conduct of their constitutional, financial, and social functions. Out-of-class activities and organizations are encouraged as a part of the broad education of the student, through which he may prepare himself for informed membership, including leadership, in community affairs.

The range of student organizations includes educational, preprofessional, political, religious, social-issue, arts, literary, and recreational groupings. Additional organizations will be formed with further development of the campus.

## **Foreign Student Affairs**

Foreign students are assisted in evaluating their abilities, planning their programs, and interpreting regulations applicable to them. This service includes assistance on problems of extension of stay, employment, border crossing, and details of maintaining legal status, housing, and understanding of the American way of life.

## **Placement Services**

Seniors who will begin their careers immediately after they are graduated are encouraged to register at the Placement Office for counseling, for aid in getting in touch with employers, and for planning and scheduling interviews with those representatives of business firms, government agencies, and nonprofit organizations who visit the Chicago Circle campus in the fall and the spring. Students should register early in the fall of the year to avoid missing important interviews with representatives of firms from all over the United States. Juniors may register shortly before entering their senior year.

The aims of the Placement Office are: to assist the University graduate in making a wise and responsible choice of a career for his own greatest satisfaction, to eliminate wasteful turnover, and to assist the graduate in achieving the most fruitful long-term investment of his talents for himself, for his employer, and for society.







# The College of Architecture and Art

LEONARD J. CURRIE, M.Arch., Dean of the College

ALVIN S. BOYARSKY, M.R.P., Associate Dean

ROWLAND RATHBUN, M.S., Assistant Dean

The College of Architecture and Art serves as a center for study and investigation in the visual and plastic arts and offers professional curricula in architecture and in several specialized areas. Emphasis is on the creative process within a broadly cultural educational program. Architecture and the arts are considered in their social context as a reflection of the highest aspirations of contemporary culture and as expressions that give meaning and purpose to human life. Principles and methodology are stressed rather than resultant form and changing styles.

All work submitted by students for credit in any course in any Department in the College of Architecture and Art belongs to The Board of Trustees of the University of Illinois, and the University reserves the right to retain, hold, copyright, use, exhibit, reproduce, and publish any work so submitted by any student for credit in any course.

## The Department of Architecture

Donald D. Hanson, M.Arch., Head of the Department

Kenneth Schaar, M.A., Assistant to the Head

### Professors

Alvin S. Boyarsky, M.R.P.; Leonard J. Currie, M.Arch.; Edward L. Deam, M.Arch.; Robert W. Gerstner, Ph.D.; Donald D. Hanson, M.Arch.; George A. Hinds, M.C.P.; Harold B. McEldowney, B.A., Emeritus; Henry L. Mikolajczyk, M.Arch.; Stanley Tigerman, M.Arch.; Frederick W. Wiesinger, Ph.D.

### Associate Professors

Robert K. Adams, M.S.; Rene Amon, Ph.D.; Anthony J. DeFilipps, B.S.; Peter W. Gygas, *Dipl. Arch.*; T. Robert Jaeger, M.Arch.; Hinman L. P. Kealy, M.C.P.; Rowland Rathbun, M.S.

### Assistant Professors

Michael S. Gelick, M.F.A.; David L. Kal, M.Arch.; Philip A. Kupritz, M.Arch.; Jon L. Liljequist, J.D.; Graeme M. Morland, R.I.B.A.; Richard J. Rothman, M.A.; Roger G. Whitmer, M.S.

### Lecturers

Jakob Blumer, M.Arch.; Lawrence Booth, B.Arch.; David Dubin, M.Arch.; Elliott Dudnik, M.S.C.E.; Lloyd Gadau, B.Arch.; Maurice Gamze, B.S.M.E.; Charles Genter, B.S.; Andrew Heard, B.Arch.; Edward Hoffman, B.S.C.E.; Philip A. Kupritz, M.Arch.; Robert G. Lukas, M.S.; Niklaus Morgenthaler, M.Arch.; James Nagle, M.Arch.; Louis I. Rocah, M.S.; Kenneth Schaar, M.A.; Donald Sunshine, B.Arch.; Anthony Tadin, B.S.C.E.; Bernard Weissbourd, J.D.; Rudolf Wolfson, B.S.E.E.

The curriculum in architecture is structured to provide the student with the initial steps in the lifelong process of qualification required to fulfill the social responsibilities of the architect.

Architecture is the art and science of building to satisfy the environmental needs of man. Within those needs, it is the architect's responsibility to analyze the inherent social, psychological, and physical factors and to translate them creatively, through the act of design, into an appropriate physical environment. Thus, as society evolves, so too does the role of the architect. Today, society has charged architecture and its codiscipline, planning, with far greater social and physical responsibilities than ever before, responsibilities that are best exemplified by the term "urbanism." The results of poverty, social disorder, and an unaccommodating environment in a rural area are quite different in impact than are these same factors in an urban environment, where they foster social, moral, and economic decay and, eventually, total cultural disintegration.

Inherent in the architect's professional success is the potential of the "good life" for the majority of the world's population and the cultural growth and development of its societies. To achieve this potential, the historical evolution of architecture is presented to the students as a matrix for the social, structural, and aesthetic aspects of the profession. The successful student learns to think for himself, to solve problems, to avoid histrionics, and to see the world around him both as it is and as it could be. The factors implicit in architecture are numerous, weighted, variable, and interdependent. Hence, it is through a balanced, flexible sequence of courses in design, building technology, structures, and the humanities that the student is encouraged to identify and to place into context these many factors.

The first, or foundation, year is common for all students in the Department; the second, third, and fourth years provide a common base for students in the Department of Architecture; the fifth year, during which the student completes his major and minor emphases, offers a maximum of flexibility for a degree program in one of the following:

Architectural Humanities	Design
Building Technology	Structures

The curriculum in architecture requires 239 quarter hours for graduation, exclusive of military training and required physical education. See page ..... for the admission requirements of the department. The candidate is then eligible for recommendation for the degree of Bachelor of Architecture in one of the above areas.

**The Curriculum in Architecture**

The courses offered in the fourth (summer) quarter are identical with those offered in the second (winter) quarter.

**First Year**

<i>First Quarter</i>	<i>Hours</i>
Architecture and Art 101—Basic Design I	3
Architecture and Art 111—Visual Communications I	2
History of Architecture and Art 141—Man and Environment	3
Mathematics 111*—Introduction to Analysis I	3-5
Rhetoric 101—Freshman Rhetoric and Composition	4
Physical Education	(1)
	<hr/> 15-17

<i>Second Quarter</i>	
Architecture and Art 102—Basic Design II	3
Architecture and Art 112—Visual Communications II	2
History of Architecture and Art 142—History of Architecture and Art I	3
Mathematics 112*—Introduction to Analysis II	3-5
Rhetoric 102—Freshman Composition and Rhetoric	4
Physical Education	(1)
	<hr/> 15-17

<i>Third Quarter</i>	
Architecture and Art 103—Basic Design III	3
Architecture and Art 113—Visual Communications III	2
History of Architecture and Art 143—History of Architecture and Art II	3
Mathematics 194*—Introduction to Automatic Digital Computing	3-5
Sociology 100—Introduction to Sociology	4
Physical Education	(1)
	<hr/> 15-17

\*Required for all students who elect a design or humanities major. Structures and building technology majors must substitute Mathematics 130, 131, 132.

**Second Year**

<i>First Quarter</i>	<i>Hours</i>
Architecture and Art 104—Basic Design IV	3
Architecture and Art 114—Visual Communications IV	2
Architecture 121—Statics and Strength of Materials I	3
History of Architecture and Art 144—History of Architecture and Art III	3
Physics 101—General Physics (Mechanics and Heat)	5
Physical Education	(1)
	<hr/> 16

*Second Quarter*

Architecture 101—Architectural Design I	6
Architecture 122—Statics and Strength of Materials II	3
Elective—from History of Architecture Art 231 through 238	4
Physics 102—General Physics (Electricity and Magnetism and Waves)	5
Physical Education	(1)
	<hr/> 18

*Third Quarter*

Architecture 102—Architectural Design II	6
Architecture 111—Building Technology I	4
Architecture 123—Statics and Strength of Materials III	3
Physics 103—General Physics (Modern Physics)	5
Physical Education	(1)
	<hr/> 18

**Third Year**

<i>First Quarter</i>	<i>Hours</i>
Architecture 201—Architectural Design III	6
Architecture 211—Building Technology II	4
Architecture 221—Structural Engineering I	3
Sociology 276—Sociology of Urban Life in Industrial Society	4
	<hr/> 17

*Second Quarter*

Architecture 212—Building Technology III	4
Architecture 222—Structural Engineering II	3
Art Elective(s) *	5
Elective (social science or humanities)	4
	<hr/> 16

*Third Quarter*

Architecture 202—Architectural Design IV	6
Architecture 213—Building Technology IV	4
Architecture 223—Structural Engineering III	3
Architecture 241—Urban and Regional Planning I	3
	<hr/> 16

\*Structures and building technology majors must substitute Math. 195 for 3 hours of art electives.

**Fourth Year***First Quarter**Hours*

Architecture 203—Architectural Design V	6
Architecture 214—Building Technology V	4
Architecture 224—Structural Engineering IV	3
Architecture 242—Urban and Regional Planning II	3
	<hr/> 16

*Second Quarter*

Architecture 204—Architectural Design Problems	6
Architecture 215—Building Technology VI	4
Architecture 225—Structural Engineering V	3
History of Architecture and Art elective from 231 through 238	4
	<hr/> 17

*Third Quarter*

Architecture 226—Structural Engineering VI	3
Art Elective(s)	5
History of Architecture and Art elective from 231 through 238	4
Elective (social science or humanities)	4
	<hr/> 16

**Fifth Year**

The fifth year is elective except Architecture 343—Professional Practice. The student will take 6 hours in his elected major in the first and second quarters and will prepare a thesis in his third quarter.

*First Quarter**Hours*

History of Architecture and Art 231 through 238 <sup>1</sup> , 331, 332; Architecture 301, 311, 312, 313, 321, 322, 323. These courses cover the major emphases; the student enrolls in those pertinent to his option for a total of	12
Elective (social science or humanities)	4
	<hr/> 16

*Second Quarter*

History of Architecture and Art 231 through 238 <sup>1</sup> , 332, 333; Architecture 302, 314, 315, 316, 324, 325, 326. These courses cover the major emphases; the student enrolls in those pertinent to his option for a total of	12
Elective (social science or humanities)	4
	<hr/> 16

*Third Quarter*

Architecture 309 or 319 or 329 or 339—thesis in the student's option.	12
Architecture 343—Professional Practice	3
	<hr/> 15

<sup>1</sup>For students in architectural humanities.



*Notes:* For course descriptions, see *Courses of Instruction*.

*General Education:* A minimum of 9 hours in social science and 9 hours in the humanities are required of all degree candidates.

Courses in the College of Engineering can be substituted for equivalent structures courses in the College of Architecture if the student's adviser consents.

## The Department of Art

Simon Steiner, M.S., Chairman of the Department

Raymond A. Dalton, M.S., Administrative Assistant

### Professors

Roland Ginzler, M.F.A.; Norman Trevor Green, Dipl. Arch. (visiting); Richard Koppe; Alfred P. Maurice, M.A.; Robert Nickle, B.A.; John F. Richardson, M.A.; Simon Steiner, M.S.; John Walley.

### Associate Professors

Morris Barazani; Leon Bellin, M.A.; Nancy Berryman, Ed.D.; Edward E. Burr, B.F.A. (Emeritus); Eugene Dana, M.Des.; Donald Dimmitt, B.S.; Martin R. Hurtig, M.A.; Nancy Stableford, M.F.A.; Tadao Takano, B.S.

### Assistant Professors

William S. Becker, M.F.A.; Wayne A. Boyer, B.S.; Klindt B. Houlberg, M.A. (on leave); Joseph D. Jachna, M.S.; Jerald Jackard, M.A.; Leon Levy, B.F.A.; Keith A. Morrison, M.F.A.; Lawrence Salomon, M.A.; Stuart Schar, Ph.D.

### Instructors

Richard F. Baronio, M.F.A.; Raymond A. Dalton, M.S.; Michael J. Elliston, B.S. (on leave); Susan B. Hawes, B.S.; Peter G. Holbrook, B.F.A.; Walter F. Korte, M.A.; Allan H. Phillips, M.F.A.; Daniel Sandin, M.S.; Hans Schaal, B.S.; Herbert Slobin, B.S.; Thomas E. Steger, M.A.; Robert W. Steigler, B.S.; Rimvydas A. Tveras, B.F.A.

### Lecturers

Gordon Barlow, B.A.; Nathan Lerner, B.S.; Norman Perman, B.F.A.; Allen Porter.

The curricula of the Department of Art are formulated to release and develop the creative powers of the student while furthering his liberal education.

Students who major in the field of art education, design or plastic and graphic arts are required to complete the two-year foundation program.

In the third year, these students will select courses in their major. The Department of Art requires students to meet the University general education requirement by taking courses in the social sciences, natural sciences, and humanities, with each student being counseled into specific general education courses.

Major areas of emphasis within the department are art education, design, and plastic and graphic arts. Within the area of design the student may specialize in communications design or industrial design. Within the area of plastic and graphic arts he may specialize in painting, sculpture, or printmaking. In either the area of design or of plastic and graphic arts, qualified students may be permitted to follow a balanced program, which will give approximately equal emphasis in the areas of specialization within the major field.

Each curriculum is designed to provide, through a wide range of offerings, a maximum of individual choice to permit flexible programs so that the student may plan, with faculty counsel, a schedule that will yield the highest degree of comprehensive skill and knowledge in the area of his choice.

For course descriptions, see *Courses of Instruction*.

## The Curricula in Art

### Two-Year Foundation Program

#### First Year

	Hours
Architecture and Art 101, 102, 103—Basic Design I, II, and III	9
Architecture and Art 111, 112, 113—Visual Communications I, II, and III	6
Architecture and Art 141—Man and Environment	3
History of Architecture and Art 142, 143—History of Architecture and Art I and II	8
Rhetoric 101, 102—Freshman Rhetoric and Composition	8
Electives (outside the College of Architecture and Art)	11-12
Physical education	(3)
	<hr/> 45-46

#### Second Year

	Hours
Architecture and Art 104, 105, 106—Basic Design IV, V, and VI	9
Architecture and Art 114, 115, 116—Visual Communications IV, V, and VI	6
History of Architecture and Art 144—History of Architecture and Art III	4
Art history (200 Level) or an academic elective	3
Electives (outside the College of Architecture and Art)	24
Physical education	(3)
	<hr/> 46

During his third and fourth years the student will follow a program, developed with faculty counsel, which, with courses taken in his first and second year, will

meet the overall credit requirements for the degree. For the degree of Bachelor of Arts in the several majors, the following requirements must be met:

**Major in Art Education**

209 hours (exclusive of physical education and basic military science) distributed as follows:

- A. 45 hours of architecture and art courses of the two-year foundation course.
- B. 50 hours in a major field of design or in plastic or graphic arts.
- C. 15 hours in supporting areas of art history, design, or plastic and graphic arts.
- D. 28 hours of education courses, including educational practice in the public schools.
- E. 8 hours of art education.
- F. 63 hours in general education courses outside the College of Architecture and Art.

**Major in Design**

*Communications Design or Industrial Design:* 189 hours (exclusive of physical education and basic military science) distributed as follows:

- A. 45 hours in architecture and art courses of the two-year foundation program.
- B. 50 hours in one of the two design offerings.
- C. 28 hours in college courses outside the area selected for the 50 hours in B.
- D. 66 hours in general education courses outside the College of Architecture and Art, and in required foundation courses outside the area of the history of architecture and art.

**Major in Plastic and Graphic Arts**

*Painting, Printmaking, or Sculpture:* 189 hours (exclusive of physical education and basic military science) distributed as follows:

- A. 45 hours in architecture and art courses of the two-year foundation program.
- B. 60 hours in one of the three offerings of plastic and graphic arts.
- C. 18 hours in college courses outside the area selected for the 60 hours in B.
- D. 66 hours in general education courses outside the College of Architecture and Art.

The following sample programs provide guidelines in program planning. Students may find that individual needs may make modifications necessary.

**Art Education**

The student who desires to major in art education can enroll in communications design, industrial design, or plastic and graphic arts. To qualify for the degree in art education, the student must also complete the following courses:

	Hours
Art 205, 213	8
Education 170, 210, 230, 250, 270	28
Speech 100, 101	5
Political Science 151	4
Psychology 100	4
Additional general education courses	50
	<hr/> 99

**Communications Design****Third Year***First Quarter*

	<i>Hours</i>
Design 201—Colloquium	1
Design 204—Communications Design	4
Design 207—Typographic Design	3
Design 245—Photography-Film*	3
Plastic and Graphic Arts 262—Printmaking*	2
General education courses	3-5
	<hr/> 16-18

*Second Quarter*

Design 210—Colloquium	1
Design 213—Communications Design	4
Design 216—Typography	3
Design 251—Photography-Film*	4
Plastic and Graphic Arts 267—Printmaking*	2
General education courses	3-5
	<hr/> 17-19

*Third Quarter*

Design 219—Colloquium	1
Design 222—Communications Design	4
Design 225—Typography	3
Design 256—Photography-Film*	4
Design 330—Synthesis*	3
General education courses	3-5
	<hr/> 18-20

**Fourth Year***First Quarter*

Design 228—Colloquium	1
Design 223—Communications Design	5
Design 208—Typography	4
Design 257—Photography*	5
General education courses	3-5
	<hr/> 18-20

*Second Quarter*

Design 233—Colloquium	1
Design 332—Commercial Design	5
Design 226—Typography	4
Design 361—Photography-Film*	4
General education courses	3-5
	<hr/> 17-18

\*Photography-film and plastic and graphic arts courses are outside the communications major; however, students in communications design are urged to take these related courses.

*Third Quarter*

Design 238—Colloquium	1
Design 337—Commercial Design	5
Design 227—Typography	5
Design 371—Photography*	4
General education courses	3-5
	<hr/> 18-20

\*Photography-film and plastic and graphic arts courses are outside the communications major; however, students in communications design are urged to take these related courses.

**Industrial Design****Third Year***First Quarter**Hours*

Design 271—Colloquium	1
Design 273—Industrial Design	3
Design 275—Industrial Design	5
Art electives	3
General education courses	3-5
	<hr/> 15-17

*Second Quarter*

Design 276—Colloquium	1
Design 278—Industrial Design	3
Design 280—Industrial Design	5
Art electives	3
General education courses	3-5
	<hr/> 15-17

*Third Quarter*

Design 281—Colloquium	1
Design 283—Industrial Design	3
Design 285—Industrial Design	5
Art electives	3
General Education	3-5
	<hr/> 15-17

**Fourth Year***First Quarter*

Design 274—Industrial Design	4
Design 286—Colloquium	1
Design 394—Industrial Design	5
Art electives	3
General education	3-5
	<hr/> 16-18

*Second Quarter*

Design 290—Colloquium	1
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Design 297—Industrial Design	3
Design 390—Industrial Design	5
Art electives	3
General education	3-5
	<hr/> 15-17

*Third Quarter*

Design 292—Industrial Design	3
Design 295—Colloquium	1
Design 394—Industrial Design	5
Art electives	3
General education	3-5
	<hr/> 15-17

Students majoring in industrial design are urged to select as electives courses in photography and communications design.

**Plastic and Graphic Arts—Painting****Third Year***First Quarter*

	<i>Hours</i>
Plastic and Graphic Arts 201—Colloquium	1
Plastic and Graphic Arts 202—Intermediate Drawing and Painting	2
Plastic and Graphic Arts 203—Intermediate Painting	3
Plastic and Graphic Arts 205—Intermediate Painting	5
Art elective	3
General education	3-4
	<hr/> 17-18

*Second Quarter*

Plastic and Graphic Arts 206—Colloquium	1
Plastic and Graphic Arts 207—Intermediate Painting	2
Plastic and Graphic Arts 210—Intermediate Painting	5
Art elective	3
General education	3-4
	<hr/> 14-15

*Third Quarter*

Plastic and Graphic Arts 211—Colloquium	1
Plastic and Graphic Arts 208—Intermediate Painting	3
Plastic and Graphic Arts 212—Intermediate Painting	2
Plastic and Graphic Arts 215—Intermediate Painting	5
Art elective	3
General education	3-4
	<hr/> 17-18

Fourth Year

First Quarter

Plastic and Graphic Arts 216—Colloquium	1
Plastic and Graphic Arts 213—Intermediate Painting	3
Plastic and Graphic Arts 217—Advanced Painting	2
Plastic and Graphic Arts 220—Advanced Painting	5
Art elective	3
General education	3-4
	<hr/> 17-18

Second Quarter

Plastic and Graphic Arts 221—Colloquium	1
Plastic and Graphic Arts 222—Advanced Painting	2
Plastic and Graphic Arts 225—Advanced Painting	5
Art elective	3
General education	3-4
	<hr/> 14-15

Third Quarter

Plastic and Graphic Arts 223—Advanced Painting	3
Plastic and Graphic Arts 227—Advanced Painting	2
Plastic and Graphic Arts 230—Advanced Painting	5
Art elective	3
General education	3-4
	<hr/> 16-17

Plastic and Graphic Arts—Printmaking

Third Year

First Quarter

	<i>Hours</i>
Plastic and Graphic Arts 261—Colloquium	1
Plastic and Graphic Arts 262—Intermediate Printmaking	2
Plastic and Graphic Arts 263—Intermediate Printmaking	3
Plastic and Graphic Arts 265—Intermediate Printmaking	5
Art elective	3
General education	3-4
	<hr/> 17-18

Second Quarter

Plastic and Graphic Arts 264—Intermediate Printmaking	4
Plastic and Graphic Arts 267—Intermediate Printmaking	2
Plastic and Graphic Arts 268—Intermediate Printmaking	3
Art elective	3
General education	3-4
	<hr/> 15-16

*Third Quarter*

Plastic and Graphic Arts 266—Colloquium	1
Plastic and Graphic Arts 269—Intermediate Printmaking	4
Plastic and Graphic Arts 270—Intermediate Printmaking	5
Art elective	3
General education	3-4
	<hr/> 16-17

**Fourth Year***First Quarter**Hours*

Plastic and Graphic Arts 271—Colloquium	1
Plastic and Graphic Arts 272—Intermediate Printmaking	2
Plastic and Graphic Arts 273—Intermediate Printmaking	3
Plastic and Graphic Arts 275—Intermediate Printmaking	5
Art elective	3
General education	3-4
	<hr/> 17-18

*Second Quarter*

Plastic and Graphic Arts 276—Colloquium	1
Plastic and Graphic Arts 274—Intermediate Printmaking	4
Plastic and Graphic Arts 277—Advanced Printmaking	2
Plastic and Graphic Arts 282—Advanced Printmaking	2
Art elective	3
General education	3-4
	<hr/> 15-16

*Third Quarter*

Plastic and Graphic Arts 281—Colloquium	1
Plastic and Graphic Arts 379—Advanced Printmaking	4
Plastic and Graphic Arts 380—Advanced Printmaking	5
Art elective	3
General education	3-4
	<hr/> 16-17

**Plastic and Graphic Arts—Sculpture****Third Year***First Quarter**Hours*

Plastic and Graphic Arts 231—Colloquium	1
Plastic and Graphic Arts 232—Intermediate Sculpture	2
Plastic and Graphic Arts 233—Intermediate Sculpture	3
Plastic and Graphic Arts 235—Intermediate Sculpture	5
Art elective	3
General education	3-4
	<hr/> 17-18

*Second Quarter*

Plastic and Graphic Arts 234—Intermediate Sculpture	4
Plastic and Graphic Arts 237—Intermediate Sculpture	2
Plastic and Graphic Arts 238—Intermediate Sculpture	3
Art elective	3
General education	3-4
	<hr/> 15-16

*Third Quarter*

Plastic and Graphic Arts 236—Colloquium	1
Plastic and Graphic Arts 239—Intermediate Sculpture	4
Plastic and Graphic Arts 240—Intermediate Sculpture	5
Art elective	3
General education	3-4
	<hr/> 16-17

**Fourth Year***First Quarter*

Plastic and Graphic Arts 241—Colloquium	1
Plastic and Graphic Arts 242—Intermediate Sculpture	2
Plastic and Graphic Arts 243—Intermediate Sculpture	3
Plastic and Graphic Arts 245—Intermediate Sculpture	5
Art elective	3
General education	3-4
	<hr/> 17-18

*Second Quarter*

Plastic and Graphic Arts 244—Intermediate Sculpture	4
Plastic and Graphic Arts 247—Advanced Sculpture	2
Plastic and Graphic Arts 249—Advanced Sculpture	4
Art elective	3
General education	3-4
	<hr/> 16-17

*Third Quarter*

Plastic and Graphic Arts 350—Advanced Sculpture	5
Plastic and Graphic Arts 354—Advanced Sculpture	4
Art elective	3
General education	3-4
	<hr/> 15-16

**The Department of History of Architecture and Art**

John D. McNee, M.A., Acting Chairman

**Professors**

H. F. Koeper, Ph.D.; John D. McNee, M.A.; Warren Sanderson, Ph.D.

**Assistant Professors**

Ross Edman, M.A.; Carol LaBranche, Ph.D.

**Instructors**

Richard Arms, M.A.; Madelaine Bullwinkel, M.A.; Francis Light, M.A.; Darrel Sewell, M.A.

**Lecturers**

Ann Goodfellow, M.A.

**Curriculum in the History of Architecture and Art**

For the degree of Bachelor of Arts, 180 hours in required courses in the Department and the College, in general education courses, and in electives. See *General University Requirements*.

*Foundation Courses* (Freshman year)

Architecture and Art 101, 102, 103—Basic Design I, II, III

Architecture and Art 111, 112, 113—Visual Communications I, II, III

History of Architecture and Art 142, 143, 144—History of Architecture and Art I, II, III

*Courses for the Major*

40 hours of architecture and art courses at the 200 and 300 levels, 16 hours of which are in one of the six areas of concentration and one course from each of three other areas:

Ancient and Classical

American and Modern

Medieval and Byzantine

Oriental

Renaissance and Baroque

Architecture

8 hours in the history of architecture

4 hours in oriental art

History of Architecture and Art 291—Art History Tutorial

4 hours from History of Architecture and Art 333, 391, 392.

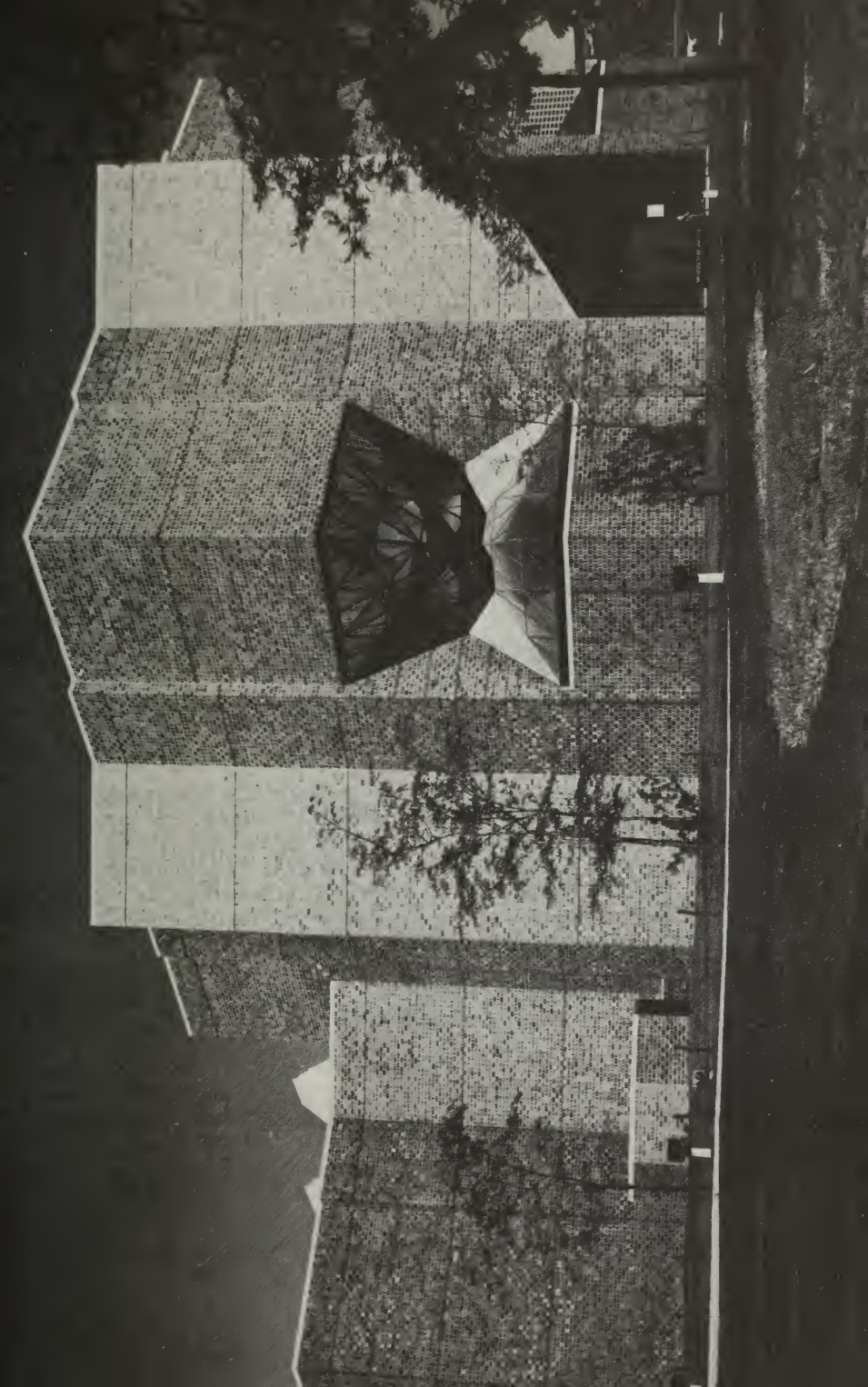
See *Courses of Instruction* section for course descriptions.

A reading knowledge of one modern language, usually French, Spanish, Italian, or German, should be attained by the end of the junior year.

A minor is not required.

*Departmental Distinction:* A candidate must have a 4.000 all-University grade-point average, a 4.500 grade-point average in history of architecture and art courses beyond the 100 level, and must pass a departmental comprehensive examination.





# The College of Business Administration

IRVIN L. HECKMANN, Ph.D., Dean of the College

S. G. HUNERYAGER, Ph.D., Associate Dean

ROBERT L. CRABB, M.A., C.P.A., Acting Assistant Dean

The degree program in the College of Business Administration is designed to provide students with a well-rounded education in preparation for careers in business administration and for careers that require training in economics. The curriculum includes courses in general education and in the various functional fields of business administration. It also allows a student to acquire skills in his chosen area of specialization.

The general education requirements provide a liberal education background and skills and tools that will enable the student to take full advantage of his academic experience. Thus, courses in mathematics, laboratory sciences, rhetoric and speech, social sciences, behavioral sciences, and humanities enable the student to learn and to perform at a higher level throughout his lifetime. The business core courses provide basic knowledge about the different areas of business. Accounting, economics, finance, management, marketing, and quantitative methods constitute the business core curriculum.

Finally, the College offers courses that enable the student to acquire specialized training in the area of his choice and, when he graduates, provides a foundation on which to base further study by learning through experience or through additional academic training.

## Professors

Bernard H. Baum, Ph.D., Management; Edwin Cohen, Ph.D., Accounting; Raymond W. Coleman, Ph.D., Economics and Management (Emeritus); Lucile Derrick, Ph.D., Quantitative Methods; Samuel Fox, J.D., Ph.D., C.P.A., Accounting; Robert W. French, Ph.D., Economics and Management; Clarence H. Gillett, Ph.D., Management (Emeritus); William D. Grampp, Ph.D., Economics; Irvin L. Heckmann, Ph.D., Management; S. George Huneryager, Ph.D., Management; Leonard Kent, Ph.D., Quantitative Methods; Alfonse T. Malinosky, M.B.A., C.P.A., Accounting; Raymond L. Richman, Ph.D., Economics; Albert J. Schneider, M.B.A., C.P.A., Accounting; Sherman Shapiro, Ph.D., Economics; William W. Tongue, Ph.D., Economics and Finance; Hugh G. Wales, Ph.D., Marketing; Robert E. Weigand, Ph.D., Marketing.

## Associate Professors

Hale C. Bartlett, Ph.D., Management; William J. Dunne, M.B.A., Management; Bert E. Elwert, D.B.A., Economics and Management; Brian Gluss, Ph.D., Quantitative Methods; Ronald E. Jablonski, D.B.A., Management; S. Madonna Kabbes, M.B.A., C.P.A., Accounting (Emerita); Richard F. Kosobud, Ph.D., Economics; Carl M. Larson, M.B.A., Marketing; Oscar Miller, M.A., Economics; Fayette B. Shaw, Ph.D., Finance.

## Assistant Professors

Robert D. Auerbach, Ph.D., Economics; Richard D. Babcock, M.B.A., Management; Robert L. Crabb, M.A., C.P.A., Accounting; Laurence Feldman, Ph.D., Marketing; Winifred B. Geldard, M.B.A., C.P.A., Economics (Emerita); Thomas M. Johnson, J.D., Ph.D., Finance and Economics; Edward C. Knudson, M.B.A., Economics (Emeritus); Mildred Levy, Ph.D., Economics; Josephine Margraff, M.B.A., Accounting; Ronald L. Miller, Ph.D., Economics and Management; Ronald P. Moses, Ph.D., Economics; Edward T. Ossman, M.B.A., C.P.A., Accounting; Brian Parsons, M.B.A., Accounting; Lalitha Sananthanan, Ph.D., Quantitative Methods; Mary Jane Schlinger, Ph.D., Marketing; Schlomo Shalit, M.B.A., Economics; Allen L. Sinai, Ph.D., Economics; Houston Stokes, Ph.D., Economics; Frederick Stubbs, Ph.D., Finance; William Talbert, M.B.A., C.P.A., Accounting; David Tuerck, Ph.D., Economics; Joseph A. Wolfe, M.B.A., Management.

## Instructors

Donald E. Baer, M.B.A., Economics; Daniel B. Belcore, M.B.A., Finance;

William R. Pokross, M.C.P., Economics; Gary Siegel, M.B.A., C.P.A., Accounting; Walter Wadycki, M.S., Quantitative Methods.

## Lecturers

Alvin D. Star, M.B.A., Marketing; Fred Travis, M.A., Management.

## Graduation Requirements

A minimum of 186 hours, exclusive of the required hours of physical education, are required for the degree of Bachelor of Science in Business Administration. They are distributed as follows:

	<i>Hours</i>
General education	96
Business core curriculum	62
Area of specialization and electives— approved by the area (department)	28
	<hr/> 186

### Summary of Graduation Requirements

#### General Education Requirement<sup>1</sup>

	<i>Hours</i>
Rhetoric 101, 102, Freshman Rhetoric and Composition	8
Rhetoric 251, Business Communication	4
Speech 100, 101, Principles of Effective Speaking	5
Mathematics 110, 111, 112 <sup>2</sup> , Finite Mathematics and Introduction to Analysis I, II	11
Laboratory science sequence*	12
Humanities sequence*	12
Philosophy 102, Elementary Logic	4
Social Science:	
Behavioral (anthropology, psychology, or sociology)	8
Economics 120, 121, Principles of Economics I, II	8
History and/or political science	8
Fine arts	3
General education electives	13
	<hr/> 96

<sup>1</sup>6 quarter hours of physical education are required in addition to the 186 hours.

<sup>2</sup>This sequence is for the student who enters the College with credit in college algebra. If he does not have such credit, he takes the Mathematics Placement Test before he registers in the College. His score determines whether he enrolls in Mathematics 100 or 104, neither of which carries credit.

\*Refer to the following table for approved sequences in the humanities, natural sciences, and the fine arts.



## Approved Sequences for Fulfillment of the General Education Requirement Humanities, Natural Sciences, and Fine Arts

### Humanities

History of Architecture and Art  
12 hours including HAA 115 and  
one course selected from HAA 142,  
143, 144 or any 200-level HAA courses

#### English

101, 102, 103  
150, 151, 152  
190, 191, 192

#### Humanities

101, 102, 103  
106, 107, 108  
151, 152, 153

#### French

161, 162, 163  
201, 202, 203\*

#### German

3 courses in literature,  
200-level or above, one of  
which may be in translation\*

#### Spanish

221, 222, 223\*  
240, 241, 242\*

French 216, German 216,  
Spanish 240 or 241\*

#### Music

130, 131 and one course  
from 215, 216, 217, 218  
219, 220

#### Philosophy

201, 203 and one additional  
course

#### Speech

121, 122, 123

### Natural Sciences (Laboratory)

#### Biological Sciences

100, 101, 102

#### Chemistry

112, 113, 114  
113, 114, 121  
117, 118, 119

#### Geography

101, 102, 103

#### Geological Sciences

101, 102, 103

#### Physical Sciences

101, 102, 103

#### Physics

101, 102, 103

### Fine Arts

#### Recommended:

##### Architecture

241

##### Art

100 or 101 or 103

##### History of Architecture and Art

142 or 143

##### Music

130 or 131

##### Speech and Theatre

121 or 329

Also acceptable: a minimum of  
3 hours in music or history of  
architecture and art courses  
in addition to the above.

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\*These 9-hour or 10-hour sequences are the only exception to the general requirement of 12-hour course sequences. The additional hours must be made up in general education courses.



## General Education Course Sequences for Transfer Students

Transfer Students Entering With:	Additional Requirements*
6 semester hours of humanities survey or 6 other hours of humanities in sequence	Any course in any field of the humanities
6 semester hours of biology	Any one of Biological Sciences 100, 101, 102
6 semester hours of physical science with laboratory	One laboratory course in physical science
3 or 4 semester hours of biology	Any two of Biological Sciences 100, 101, 102
3 or 4 semester hours of physical science survey	Two courses in physical science (laboratory)
3 semester hours of humanities survey	Two courses in sequence in humanities

### Business Core Requirements

	<i>Hours</i>
Accounting 100, 101, 102, Accounting I, II, III	9
Economics 320, Macroeconomic Theory	4
Economics 321, Microeconomic Theory	4
Economics 322, Managerial Economics or Economics 323, Business Conditions Analysis	4
Quantitative Methods 170, 171, 172, Statistics I, II, III	9
Finance 340, Money and Banking	4
Finance 341, Business Finance	4
Marketing 360, Principles of Marketing	4
Management 350, Organization and Administration	4
Management 351, Organization Theory	4
Management 359, Business Policy	4
Business Law 310, Managerial Jurisprudence	4
	<hr/> 58

### Student Responsibility for Course Selection

Under the condition that he is making satisfactory progress toward his degree, the *responsibility* for course selection rests with the student. "Satisfactory progress toward the degree" is defined as meeting *all* the requirements listed below:

- A. Each student must carry not less than 12 and not more than 19 hours each quarter. This applies to students on probation as well as to

\*To fulfill a sequence requirement, a student must satisfactorily complete a course (or courses) or equivalent for which he has no previous credit.

those in good standing. Only the Assistant Dean's approval can alter this requirement.

- B. Every student *must* enroll in mathematics *every quarter*, beginning with his first quarter at Chicago Circle, until the Mathematics 110, 111, 112 sequence is completed.
  - C. All sophomores *must* enroll (1) in Economics 120, 121 and (2) in Accounting 100, 101, 102. These courses must be completed *before* the junior year.
  - D. Students must enroll in Quantitative Methods 170, 171, 172 as soon as possible, preferably in the sophomore year. These courses must be completed by the end of the junior year.
  - E. Students must enroll in a minimum of 12 quarter hours that apply toward the degree or in courses which are prerequisite to courses that count toward the degree.
  - F. Transfer students must fulfill freshman and sophomore requirements as quickly as possible and must fulfill all the foregoing requirements.
- Important:* Courses taken to fulfill one requirement may not be used to fulfill any other requirement.



**A Typical Program in the College of Business Administration  
Common to All Areas Except Quantitative Methods \***

Quarter Class	1		2		3	
	Course	Hours	Course	Hours	Course	Hours
<i>Freshman</i>	Speech 100	3	Speech 101	2	Rhet. 251	4
	Math. 110*	5	Math. 111	3	Math. 112	3
	Rhet. 101	4	Rhet. 102	4	Phil. 102	4
	Science (Lab) or Humanities	4	Science (Lab) or Humanities	4	Science (Lab) or Humanities	4
	P.E.M. (W)	1	P.E.M. (W)	1	P.E.M. (W)	1
	Total	17	Total	14	Total	16=47
<i>Sophomore</i>	Actg. 100	3	Actg. 101	3	Actg. 102	3
	Econ. 120	4	Econ. 121	4	Fin. 340	4
	Q.M. 170	3	Q.M. 171	3	Q.M. 172	3
	Beh. Sci. or (Hist. or PolS)	4	Beh. Sci. or (Hist. or PolS)	4	Beh. Sci. or (Hist. or PolS)	4
	P.E.M. (W)	1	P.E.M. (W)	1	P.E.M. (W)	1
	Total	15	Total	15	Total	15=45
<i>Junior</i>	Econ. 320	4	Econ. 321	4	Econ. 322 or	
	Mgmt. 350	4	Fin. 341	4	323	4
	Mktg. 360	4	Mgmt. 351	4	Fine Arts	3
	(Hist. or PolS) or		Area of Concen. or Elective	4	Area of Concen. or Elective	8
	Beh. Sci.	4			Gen. Ed. Elec.	4
	Total	16	Total	16	Total	19=51
<i>Senior</i>	Bus. Law 310	4	Humanities or Science (Lab)	4	Mgmt. 359	4
	Humanities or Sci. (Lab)	4	Gen. Ed. Elec.	4	Humanities or Science (Lab)	4
	Gen. Ed. Elec.	5	Area of Concen. or Elective	8	Area of Concen. or Elective	8
	Area of Concen. or Elective	4				
	Total	17	Total	16	Total	16=49

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\*In the freshman year the student should begin with Mathematics 110 if his placement test indicates so. Otherwise, he should select the mathematics course indicated by placement.

Areas of Specialization

Accounting

Accounting is concerned with (1) the measurement of income and wealth derived from economic enterprise and (2) the communication of information about the financial condition of and the results of activities of economic organizations. The specific functions include management control, tax management, and the attest function.

- Required Courses**—32 hours, distributed as follows:
- Accounting 301—Asset Valuation and Income Determination, 4 hours
  - Accounting 302—Accounting for Entity Interest, 4 hours
  - Accounting 300—Managerial Cost Accounting, 4 hours
  - Accounting 303—Auditing, 4 hours
  - Accounting 304—Federal Income Tax, 4 hours
- Plus two from the following (8 hours):
- Accounting 305—Planning and Control, 4 hours
  - Accounting 306—Readings and Advanced Problems, 4 hours
  - Quantitative Methods 375—Information Systems I, 4 hours
  - Quantitative Methods 376—Information Systems II, 4 hours
  - Quantitative Methods 370—Multivariate Analysis, 4 hours
  - Mathematics 194—Introduction to Automatic Digital Computing, 4 hours
  - Economics 335—Econometrics, 4 hours
  - Electives approved by the area (department) 4 hours

Suggested Course Schedule for Accounting Majors

Junior Year		Senior Year	
<i>First Quarter</i>	<i>Hours</i>	<i>First Quarter</i>	<i>Hours</i>
Accounting 301 .....	4	Accounting 303 .....	4
Economics 320 .....	4	Behavioral science or history	
Marketing 360 .....	4	or political science .....	4
Management 350 .....	4	General education elective .....	5
	16	Humanities .....	4
			17
 <i>Second Quarter</i>		 <i>Second Quarter</i>	
Accounting 302 .....	4	Accounting 304 .....	4
Economics 321 .....	4	Business Law 310 .....	4
Finance 341 .....	4	Accounting or business	
Management 351 .....	4	elective .....	4
	16	Humanities .....	4
			16

*Third Quarter*

Accounting 300 .....	4
Economics 322 or 323 .....	4
Behavioral science or history or political science .....	4
Fine arts .....	3
General education elective .....	
Accounting elective .....	3
	<hr/>
	18

*Third Quarter*

Accounting elective .....	4
Management 359 .....	4
General education elective .....	4
Humanities .....	4
	<hr/>
	16

**Economics**

Economics deals with determinants of the general level of employment, production, and income and the principles of allocating resources to maximize benefits to the public. It provides the essential background for applications in business administration and the social sciences.

**Required Courses**—32 hours, distributed as follows:

Four courses from the designated area with at least one from each area for a total of 16 hours.

*Area I*

- Economics 324—Economic History of the United States, 4 hours
- Economics 325—Economic History of Europe, 4 hours
- Economics 326—History of Economic Thought, 4 hours

*Area II*

- Economics 327—Comparative Economic Systems, 4 hours
- Economics 328—Government Finance, 4 hours
- Economics 329—Industrial Organization, 4 hours
- Economics 330—Government and Business, 4 hours
- Economics 331—Labor Economics, 4 hours
- Economics 332—Urban Economics, 4 hours
- Economics 398—Independent Study in Economics\*
- Economics 399—Special Topics in Economics\*

\*Hours of credit depend on arrangement with instructor.

*Area III*

- Economics 322—Managerial Economics, 4 hours, or
- Economics 323—Business Conditions Analysis, 4 hours\*\*
- Economics 333—International Economics, 4 hours
- Economics 334—Economic Development, 4 hours
- Economics 335—Econometrics, 4 hours
- Electives approved by the area (department), 16 hours

\*\*Whichever is not elected to satisfy the Core requirement.



Suggested Course Schedule for Economics Majors

Junior Year		Senior Year	
<i>First Quarter</i>	<i>Hours</i>	<i>First Quarter</i>	<i>Hours</i>
Economics 320 .....	4	Business Law 310 .....	4
Management 350 .....	4	Humanities .....	4
Marketing 360 .....	4	General education elective .....	5
Behavioral science or history or political science .....	4	300-level economics course .....	4
	16		17
<i>Second Quarter</i>		<i>Second Quarter</i>	
Economics 321 .....	4	Humanities .....	4
Finance 341 .....	4	General education elective .....	4
Management 351 .....	4	300-level economics course .....	4
Behavioral science or history or political science .....	4	Free elective .....	4
	16		16
<i>Third Quarter</i>		<i>Third Quarter</i>	
Economics 322 or 323 .....	4	Management 359 .....	4
Fine arts .....	3	Humanities .....	4
300-level economics course .....	4	300-level economics course .....	4
General education elective .....	4	Elective .....	4
	15		16

Finance

The finance curriculum explores the influence of the monetary and banking system on the general business level, the principles of financial analysis and control as applied to individual business firms, and economic and financial factors bearing on the valuation and selection of securities.

- Required Courses**—32 hours, distributed as follows:
- Finance 342—Investments, 4 hours
  - Finance 343—Risk and Insurance, 4 hours
  - Finance 344—Investment Policy, 4 hours
  - Finance 345—Problems in Business Finance, 4 hours
  - Electives approved by the area (department), 16 hours

Suggested Course Schedule for Finance Majors

Junior Year		Senior Year	
<i>First Quarter</i>	<i>Hours</i>	<i>First Quarter</i>	<i>Hours</i>
Economics 320 .....	4	Business Law .....	4

General education elective .....	4
Management 350 .....	4
Behavioral science or history or political science .....	4
	<hr/> 16

*Second Quarter*

Economics 321 .....	4
Marketing 360 .....	4
Management 351 .....	4
Behavioral science or history or political science .....	4
	<hr/> 16

*Third Quarter*

Accounting 301 .....	4
Finance 341 .....	4
Fine Arts .....	3
Finance 343 .....	3
	<hr/> 15

\*Recommended.

Humanities .....	4
Finance 342 .....	4
General education elective .....	5
	<hr/> 17

*Second Quarter*

Finance 344 .....	4
Humanities .....	4
Finance 345 .....	4
Economics 323* .....	4
	<hr/> 16

*Third Quarter*

Management 359 .....	4
Humanities .....	4
General education elective .....	4
Economics 322* .....	4
	<hr/> 16

**Management**

The degree program in management provides students with a theoretical and practical preparation for assuming responsible managerial and executive positions in a variety of working organizations. All specialized options within the management area emphasize analytical preparation for effective decision making and for broadening preparation for leadership positions.

**Required Courses**—32 hours, distributed as follows:

1. Management 352—Administrative Practices, 4 hours
2. Two courses from the following fields; 8 hours

*Operations and Systems Management*

This option provides the student with a sound background in the management sciences and in the production function common to all work organizations. Emphasis is upon computer applications, management information systems, and materials management.

For specialists in operations and systems management:

Management 356—Operations and Systems Management I, 4 hours

Management 357—Operations and Systems Management II, 4 hours.

*Personnel and Industrial Relations*

Personnel and industrial relations is concerned with the effective utilization of human resources within work organizations. Emphasis is on the behavior of people at work and the staff programs available to managers for more

effectively utilizing people at work and for coping with human problems. Union-management relations are also explored.

For specialists in personnel and industrial relations:

Management 353—Personnel Management, 4 hours

Management 354—Industrial Systems, 4 hours

#### *General Administration*

The emphasis of the general administration program is on acquainting students with the many and varied aspects of the manager's role in complex working organizations. Stress is placed upon the internal dynamics of complex work organizations, the structural components, and the many personal and interpersonal problems of the manager.

For general administration background students: a combination of the above options with the consent of the adviser.

3. Three courses from the following areas, 12 hours
  - A. Economics 322—Managerial Economics, 4 hours or  
Economics 323—Business Conditions Analysis, 4 hours (whichever is not taken in the core)
  - B. One course from an approved 300-level business core
  - C. One approved 200-level or 300-level course outside of business
4. Electives approved by the area (department), 8 hours

### **Suggested Course Schedule for Management Majors**

#### **Junior Year**

<i>First Quarter</i>	<i>Hours</i>
Economics 320 .....	4
Management 350 .....	4
Marketing 360 .....	4
Behavioral science or history or political science .....	4
	<hr/> 16

#### *Second Quarter*

Economics 321 .....	4
Finance 341 .....	4
Management 351 .....	4
Behavioral science or history or political science .....	4
	<hr/> 16

#### *Third Quarter*

Economics 322 or 323 .....	4
Fine arts .....	3
Management 352 .....	4
General education elective .....	4
	<hr/> 15

#### **Senior Year**

<i>First Quarter</i>	<i>Hours</i>
Business Law 310 .....	4
Humanities .....	4
General education elective .....	5
Major subject .....	4
	<hr/> 17

#### *Second Quarter*

Humanities .....	4
General education elective .....	4
Major subject .....	8
	<hr/> 16

#### *Third Quarter*

Management 359 .....	4
Humanities .....	4
Major subject .....	8
	<hr/> 16

Marketing

Modern marketing management involves the integration of materials from diverse disciplines. Psychology, sociology, and other behavioral sciences contribute to a better understanding of consumer behavior, and quantitative methods are increasingly used in the analysis of marketing information.

- Required Courses—32 hours, distributed as follows:  
Marketing 361—Consumer Market Behavior, 4 hours  
Marketing 362—Marketing Research, 4 hours  
Marketing 363—Marketing Organizations, 4 hours  
Marketing 364—Managing Marketing Communications, 4 hours  
Marketing 365—Marketing Management, 4 hours  
Electives approved by the area (department), 12 hours

Suggested Course Schedule for Marketing Majors

Junior Year		Senior Year	
<i>First Quarter</i>	<i>Hours</i>	<i>First Quarter</i>	<i>Hours</i>
Marketing 360 .....	4	Marketing 363 .....	4
Economics 320 .....	4	Business Law 310 .....	4
Management 350 .....	4	Humanities .....	4
Behavioral science or history or political science .....	4	General education elective .....	5
	16		17
<i>Second Quarter</i>		<i>Second Quarter</i>	
Marketing 361 .....	4	Marketing 364 .....	4
Economics 321 .....	4	Humanities .....	4
Management 351 .....	4	General education elective .....	8
Finance 341 .....	4		16
	16	<i>Third Quarter</i>	
<i>Third Quarter</i>		Marketing 365 .....	4
Marketing 362 .....	4	Humanities .....	4
Economics 322 or 323 .....	4	Management 359 .....	4
Behavioral science or history or political science .....	4	Elective chosen by the Marketing Department .....	4
Fine arts .....	3		16
	15		

Quantitative Methods

During the past few years there has been a rapid growth of a body of knowledge in which mathematics is applied to the analysis of business prob-

lems. These developments are based on techniques drawn from classical mathematics in areas such as matrix algebra, calculus, and probability theory. In addition, these developments have stimulated new types of mathematical analyses, such as linear programming, dynamic programming, theory of games, and other analytical techniques usually associated with operations research.

The Quantitative Methods Area in the College of Business Administration requires of its majors a thorough background in classical mathematics and up-to-date knowledge in many of the aspects of operations research and computer science. These will enable graduates to bring to the business world an analytical approach to the solution of business problems; also, government and other areas of public administration find a use for specialists in this area. Graduates can expect to find employment in such fields as systems analysis, computer center operation, statistical quality control, and sampling.

- Required Courses**—32 hours, distributed as follows:
- Quantitative Methods 370—Multivariate Analysis, 4 hours
  - Quantitative Methods 371—Survey Research, 4 hours
  - Quantitative Methods 375—Systems, 4 hours
  - Quantitative Methods 376—Survey of Operations Research, 4 hours
  - Mathematics 348—Linear Transformations and Matrices, 5 hours
  - Mathematics 375—Probability II, 3 hours
  - Electives approved by the area (department), 8 hours

Typical Program in Quantitative Methods

Freshman Year

<i>First Quarter</i>	<i>Hours</i>
Mathematics 110 .....	5
Rhetoric 101 .....	4
Science (laboratory) .....	4
Speech 100 .....	3
Physical Education .....	1
	<u>17</u>

<i>Second Quarter</i>	
Mathematics 132 .....	5
Rhetoric 102 .....	4
Science (laboratory) .....	4
Speech 101 .....	2
Physical Education .....	1
	<u>16</u>

Sophomore Year

<i>First Quarter</i>	<i>Hours</i>
Accounting 100 .....	3
Economics 120 .....	4
Quantitative Methods 170 .....	3
Rhetoric 251 .....	4
Physical Education .....	1
	<u>15</u>

<i>Second Quarter</i>	
Accounting 101 .....	3
Economics 121 .....	4
Mathematics 195 .....	3
Quantitative Methods 171 .....	3
Physical Education .....	1
	<u>14</u>



<i>Third Quarter</i>	<i>Hours</i>
Fine Arts . . . . .	3
Mathematics 133 . . . . .	5
Philosophy 102 . . . . .	4
Science (laboratory) . . . . .	4
Physical Education . . . . .	1
	<hr/>
	17

## Junior Year

<i>First Quarter</i>	
Behavioral science . . . . .	4
Economics 320 . . . . .	4
Management 350 . . . . .	4
Mathematics 370 <sup>a</sup> . . . . .	3
Elective <sup>b</sup> . . . . .	3
	<hr/>
	18

<i>Second Quarter</i>	
Economics 321 . . . . .	4
Mathematics 348 . . . . .	5
Mathematics 375 . . . . .	3
Management 351 . . . . .	4
	<hr/>
	16

<i>Third Quarter</i>	
Economics 322 or 323 . . . . .	4
Finance 341 . . . . .	4
Quantitative Methods 375 . . . . .	4
Quantitative Methods 370 . . . . .	4
	<hr/>
	16

<i>Third Quarter</i>	<i>Hours</i>
Accounting 102 . . . . .	3
Finance 340 . . . . .	4
Quantitative Methods 172 . . . . .	3
Behavioral science . . . . .	4
Physical Education . . . . .	1
	<hr/>
	15

## Senior Year

<i>First Quarter</i>	
Humanities . . . . .	4
Management 359 . . . . .	4
Quantitative Methods 371 . . . . .	4
Quantitative Methods 376 . . . . .	4
	<hr/>
	16

<i>Second Quarter</i>	
Business Law 310 . . . . .	4
History or political science . . . . .	4
Humanities . . . . .	4
Electives <sup>b</sup> . . . . .	4
	<hr/>
	16

<i>Third Quarter</i>	
Humanities . . . . .	4
History or political science . . . . .	4
Marketing 360 . . . . .	4
Elective <sup>b</sup> . . . . .	4
	<hr/>
	16

<sup>a</sup>It is recommended that Mathematics 195 be taken in preparation for Quantitative Methods 375; Mathematics 370, in preparation for Mathematics 375.

<sup>b</sup>The following are recommended electives for quantitative methods majors:

1. Quantitative Methods 370—Dynamic Programming  
Economics 335—Econometrics
2. Mathematics 280—Problem Oriented Languages  
Mathematics 281—Assembly Language Programming
3. Mathematics 220—Elementary Differential Equations I  
Mathematics 321—Elementary Differential Equations II  
Mathematics 322—Elementary Partial Differential Equations I
4. Mathematics 310—Higher Analysis I  
Mathematics 311—Higher Analysis II  
Mathematics 312—Higher Analysis III
5. Mathematics 340—Modern Higher Algebra I  
Mathematics 341—Modern Higher Algebra II  
Mathematics 342—Modern Higher Algebra III

The prerequisites and electives stated in (a) and (b) above may be used to satisfy the 13-hour general education requirement.



# The College of Education

VAN CLEVE MORRIS, Ed.D., Dean of the College

GEORGE C. GILES, Jr., Ph.D., Associate Dean

EMANUEL HURWITZ, Ph.D., Assistant Dean

CHARLES E. MADER, Ed.D., Assistant Dean

JOSEPH J. MALINCHOC, Ed.D., Director of Student Teaching

DAVID A. WILSON, M.S., Assistant to the Dean for Business Affairs

## Professors

Jean H. Baer, Ph.D.; Robert M. Crane, Ed.D. (on leave); Maurice J. Eash, Ed.D.; Andrew M. Greeley, Ph.D.; David M. Jackson, Ph.D.; Van Cleve Morris, Ed.D.; David A. Page, A.M.; Victor E. Ricks, Ph.D.; Loretta B. Sauer, Ed.D. (Visiting).

## Associate Professors

Armin Beck, Ph.D.; Patricia Charlier, Ph.D.; Dorothy L. DeBoer, Ph.D.; George C. Giles, Jr., Ph.D.; Eliezer Krumbein, Ph.D.; Joseph J. Malinchoc, Ed.D.; Betty E. Orr, Ph.D. (on leave); Elizabeth C. Porch, Ed.D.; Daniel Powell, M.A.; Madelaine T. Shalabi, Ph.D.

## Assistant Professors

Aurora L. Biamonte, Ph.D.; Joseph L. Braga, Ed.D. (Visiting); Rheta L. DeVries, Ph.D.; Frederick D. Erickson, Ph.D.; Robert B. Grant, Ph.D.; Emanuel Hurwitz, Ph.D.; Kenneth R. Johnson, Ed.D.; Carolyn Leonard, M.A.; Charles E. Mader, Ed.D.; Julius Menacker, Ed.D.; George E. Monroe, Ph.D.; Donald Moore, Ed.D.; Robert H. Ratcliffe, Ed.D.; William A. Silverman, J.D.; Aimee W. Strawn, M.Ed.; Roland W. Swaim, Ed.D.; Harriet Talmage, Ph.D.; Charles A. Tesconi, Jr., Ed.D.; Philip W. Tiemann, Ph.D.; Judith V. Torney, Ph.D.; Donald R. Warren, Ph.D.; Thomas A. Wilson, Ed.D.

## Instructors

Ann G. Adams, M.A.; Therese L. Baker, B.A.; Robert R. Blake, Ph.D.; Carmen J. Carsello, M.A.; Langston L. Coleman, M.S.T.; Grace E. DeGirolamo, M.Ed.; Marie L. Johnson, M.S.; Anna M. Larson, M.Ed.; Dean H. Lowman, M.Ed.; Sheila McKenzie, B.A.; Ward W. Weldon, M.B.A.; Carlton I. Williams, M.Ed.; David A. Wilson, M.S.

## Lecturers

Lila Swell, Ed.D. (Visiting)

## Assistants

Michael C. Barnett; Thomas E. Barrett, B.S.; Helen S. Brown, B.A.; Augustine Juodvalkis, B.A.; William C. McCready, M.A.; Ellen D. Richardson; Linda M. Smith, B.A.; Judith A. Streng, B.A.; Jeanette V. Winkel, B.A.

## Student Teaching Supervisors

*Secondary.* Art: Leon Bellin, M.A.; Biology: James A. Bond, Ph.D., Marlen F. Mahoney, M.A.; Chemistry: Frances Seabright, M.S.; English: Margaret M. Angoli, M.A., Kenneth E. Bidle, Ph.D., Elaine Grauer, M.S., Pearl Greenstein, M.A., Anne Phillips, M.S.; French: Dorothy G. Barber, M.A., Carrie D. Moore, M.A.; Geography: Mildred Finney, Ph.D., James Landing, Ph.D., Albert J. Larson, M.A.; German: Daniel G. Harrington, Ph.D.; History: Gerald A. Danzer, Ph.D., Philip H. Dreyer, M.A., William A. Peters, M.A., Andrew K. Prinz, Ph.D.; Latin: Dwora Gilula, M.A.; Mathematics: Winifred Berglund, M.A., Julia B. Linn, M.S., Kenneth H. Murphy, M.S., Grace M. Nolan, M.A., Helen W. Sears, M.A., Rose L. Vedral, M.A.; Physical Education for Men: Benedict Montcalm, M.S., Thomas E. Sattler, M.S.; Physical Education for Women: Linda Bain, M.S., Helen M. Heitmann, Ph.D., Marion Kneer, Ed.S.; Physics: Edward B. McNeil, Ph.D.; Political Science: Harold M. Barger, M.A.; Spanish: Violet Bergquist, M.A., Ramona Spinka, M.A.; Speech: Grace Holt, M.A., Frances L. Thornton, M.A.

*Elementary.* Catherine Fishel, B.A.; Loretta B. Sauer, Ed.D.; Aimee W. Strawn, M.Ed.; Carlton I. Williams, M.Ed.

*Special Education.* Ann G. Adams, M.A.; Dorothy L. DeBoer, Ph.D.; Grace DeGirolamo, M.A.; Robert B. Grant, Ph.D.

Established to provide professional study in education, the College offers the professional courses for students preparing to teach in the elementary and secondary schools, with unique opportunities for students who plan to teach in urban schools. Courses in general education and in the areas of specialization for students preparing to teach in secondary schools are administered by and taught in the various departments of the colleges. Students preparing to teach physical education enter the School of Physical Education, and those preparing to teach in the secondary schools enter the College of Liberal Arts and Sciences. See *Requirements for Admission to Undergraduate Study*. The curricula for the preparation of elementary and secondary school teachers as listed in this Catalog have been approved by the University, the Illinois State Certification Board, and the National Council for the Accreditation of Teacher Education.

## Emphasis on Urban Education

Situated as it is in the center of a great metropolis, the College is ideally suited to educate teachers for urban schools. Cooperative programs with the Chicago Public Schools and nearby suburban schools afford excellent opportunities for useful laboratory experiences and research. The College supports appropriate community projects and welcomes community cooperation for improvement of teacher education.



## **The Council on Teacher Education**

The University Council on Teacher Education is responsible for coordinating teacher education programs throughout the University and for maintaining relationships with the Chicago and the State of Illinois certification authorities. On recommendation by the University to the State Teachers Certification Board, graduates of teacher education curricula are eligible for certification in Illinois outside of Chicago. Graduates generally qualify for certification in other states and are generally eligible to take the examination for Chicago also. To be eligible for graduation and recommendation for certification a student must be enrolled in an approved program in teacher education. Graduates of curricula approved by the Council on Teacher Education are eligible for admission to the graduate college of most institutions that offer majors in the student's first or second field of specialization or in the professional areas of education.

### **Admission Requirements**

An applicant for admission to a teacher education curriculum must meet the admission requirements of the college offering the chosen curriculum. A student who is transferring to a teacher education curriculum of the University of Illinois at Chicago Circle from another curriculum, college, or institution and who has completed 90 quarter hours of credit must present a cumulative grade point average of 3.500 or more, based on a 5.000 system, for admission in good standing. Those whose cumulative averages are less than 3.300 are not admitted to teacher education curricula.

### **Advising Program**

Each student will be assigned an adviser in his first field of specialization; for example, if he plans to teach English, he will have an adviser in the English Department who will guide him in his selection of courses preparatory to the teaching of English and to eligibility for certification. Elementary education students will be advised by the faculty and staff of the College of Education.

Students who desire to enter a teaching curriculum or desire to change from one teacher education curriculum to another should consult with the dean or director of the college in which the curriculum is administered.

### **Advanced Standing Requirements**

Continuation in teacher education curricula beyond the sophomore year is contingent on admission to advanced standing in teacher education, determined after the completion of 75 to 90 quarter hours of course work.



The decision is based on the applicant's academic, personal, physical, and verbal and written communication qualifications.

Student Teaching

A professional quarter of student teaching (including a seminar) is required in the senior year. A student in teacher education completes Education 170, 210, 230 or 235, and 250 in sequence prior to student teaching. Student teaching is offered during the fall, winter, and spring quarters of the academic year. It is recommended that student teaching be completed during the eleventh quarter of the student's program; however, where this involves the summer quarter, student teaching is to be completed during the terminal quarter.

*Application for Student Teaching.* A student must apply for student teaching during the first three weeks of the winter quarter preceding the academic year in which student teaching is planned. Application forms may be obtained from the Office of the Director of Student Teaching, 703 Science and Engineering Offices.

As a general rule, a student is admitted to student teaching only if he has been admitted to advanced standing in teacher education. Unless there has been deterioration in the academic or personal qualifications since he was admitted to advanced standing, a student is usually eligible for such admission. A candidate for a degree in teacher education and for eligibility for certification must complete student teaching while he is enrolled in the University of Illinois at Chicago Circle.

Student-teaching assignments will be in the Chicago and suburban public schools. For most students, an additional personal expense of approximately \$75 (transportation, lunches, and incidentals) will be incurred during the quarter in which student teaching is scheduled.

Curriculum Preparatory to Teaching in Elementary Schools

For the degree of Bachelor of Arts in Elementary Education, a minimum of 180 hours, exclusive of physical education and basic military science, is required. The 180 hours should be distributed as follows:

<i>Language Arts</i>	24 hours
Rhetoric 101, 102—Freshman Rhetoric and Composition	8
English <sup>1</sup> or language <sup>2</sup>	8
Education 221—Children's Literature	4
Speech 171—Principles of Speech Development	4
<i>Science</i>	27
Biology (with laboratory)	12
Health science	3
Physical science (with laboratory)	12

<i>Social Science</i>	40
Geography (world regional, advanced regional)	8
American history	12
Sociology	8
Political Science 151—American Government	4
Psychology	8
<i>Fine Arts</i>	12
Art 204—Art for Elementary Teachers	4
Music 250 <sup>3</sup> —Music for Elementary Teachers	4
Creative arts	4
<i>Mathematics</i>	12
Mathematics 106, 107, 108—Mathematics for Elementary Teachers	12
<i>Physical Education</i>	3
Physical Education for Women 220, 221—Elementary School	
Games and Self-testing Activities; Rhythmic Activities	4
Required physical education	6 quarters
<i>Education</i>	31-33
Education 170, 210, 235, 250, 270	28
Education 261—Teaching of Reading	4-8
<i>Areas of Concentration</i>	12-18
Mathematics—Science	51
39 hours listed above and 12 hours credit in one subject, such as mathematics or biology.	
Foreign Language	30
Advanced hours in language meet the English requirement (101-102-103 language courses excluded)	
Social Science	52
40 hours listed above and 12 hours in advanced courses in one field— psychology, sociology, economics, history, philosophy, political science, geography.	
Language Arts	42
24 hours listed above and 18 advanced hours.	
Electives	5-17

<sup>1</sup>Satisfies the general education requirement in humanities.

<sup>2</sup>An 8-hour sequence in the literature of one foreign language at the 200 level.

<sup>3</sup>A proficiency examination in Music 100 (prerequisite for Music 250) is given by the Department of Music in the fourth week of each quarter. Arrangements for this test are made with the department office.

## Curricula Preparatory to Teaching in Secondary Schools

Each student seeking a degree and certification for teaching at the secondary level may have *two* teaching specializations. The curricula in

teacher education provide for the adequate development of the major field of specialization; the minor specialization if required for graduation should be selected from the following teacher education list of major fields of specialization. If the student needs assistance in the selection of a program for the teacher education minor, he should consult the adviser for the major.

The following table lists the fields of specialization in which degrees are granted and the total number of hours required for each.

### Fields of Specialization

Total hours required are exclusive of basic military science and required physical education.

<i>Field</i>	<i>Degree Awarded</i>	<i>General Education</i>	<i>Major</i>	<i>Minor</i>	<i>Educa- tion</i>	<i>Elec- tives</i>	<i>Total</i>
Art	B.A.	52	50	—	28	15	209†
Biology	B.S.	40-52	48	33	28	0-14	195
Chemistry	B.S.	40-64	48	30-36	28	0-23	190
English	B.A.	52-76	52	32	28	0-18	180
French	B.A.	52	39	30	28	25-31	180
Geography	B.S.	40-64	48	35	28	10-34	180
German	B.A.	52	45	30	28	17-23	180
History	B.A.	52-76	48	30	28	0-22	180
Mathematics	B.S.	52-76	55	30	28	5-19	184
*Physical Education	B.S.						
Men		56	73		28	0-36	203
Women		69	63-69		28	29-36	195-196
Physics	B.S.	37	47	31	28	0-4	184
Political Science	B.A.	52-72	48	30	28	2-22	180
Sociology	B.A.	52-76	48	32	28	0-22	180
Spanish	B.A.	52	49	30	28	28-34	180
Speech	B.A.	52-76	48	30	28	0-22	180

\*Physical Education is administered by the School of Physical Education.

†Total hours include 45 hours in the foundation program. Art is administered by the Department of Art.

# **Illinois State Teachers Certification Requirements** **Minimum Academic Requirements for State Certificates** Effective September 1, 1967

The following table does not apply to applicants who are graduates of Illinois Approved Entitlement Programs or out-of-state recommended NCATE programs. This table is a guide only for prospective students. University of Illinois at Chicago Circle programs fulfill all of the requirements detailed below.

## Required Credits in Semester Hours

Type of Certificate	Standard Elementary I	Standard High School II	Standard Special III	Junior College IV	Special V	Provisional VI
Grades certificate is valid for	Kinder- garten through 9	6 through 12	Kinder- garten through 14	13 14	11 12 <sup>p</sup>	Kinder- garten through 12
Life of Certificate	4 years	4 years	4 years			2 years <sup>n</sup>
Degree required	B.A. or B.S.	B.A. or B.S.	B.A. or B.S.	B.A. or M.S.	B.A. or B.S.	B.A. or B.S.
General Education	78	42	42			
1. Language arts	8 <sup>b</sup>	8	8			
2. Science	6 <sup>b</sup>					
3. Mathematics	4 <sup>b</sup>	6 <sup>f</sup>	6 <sup>f</sup>			
4. Social science*	6 <sup>b</sup>	6	6			
5. Humanities	6 <sup>a, b</sup>	6	6			
6. Health and physical education	3	3	3			
7. Additional work in any of above fields and/or psychology (except educa- tional psychology) for a total of	78	42	42			
Professional Education	16	16	16			
1. Educational psychology**	2	2	2			
2. Methods and techniques of teaching	2 <sup>c</sup>	2 <sup>e</sup>	2			
3. History and/or philosophy of education	2	2	2			

*Continued*





The following rules are used in evaluating transcripts of applicants for certificates:

1. If a proficiency test is shown specifically on an official transcript(s), it may be substituted for the required semester hours of mathematics. Four years of high school mathematics may also be offered in lieu of this requirement if they are listed specifically on the official transcript. One semester hour of credit may be given for each year of high school credit in foreign languages for a total not to exceed 4 semester hours if such credit is listed on the transcript.
2. Language arts include composition, rhetoric, grammar, oral and written expression, literature, dramatics, journalism, speech, reading, spelling, and penmanship or their equivalents in integrated courses.
3. Social science must include a course in American history and/or government. Additional courses will be accepted from history, political science, sociology, economics, geography (except physical geography), and general social science or their equivalents in integrated courses.
4. "Humanities" covers courses in art, music, philosophy, foreign language, literature, and 3 hours of religion or the equivalents in integrated courses.
5. "Health and physical education" covers hygiene, health education, safety, driver education, physical education, and recreation or their equivalents in integrated courses.
6. Integrated courses providing experiences in two or more areas and in quantity comparable to suggested minimums may be approved as shown on transcript(s) or by a registrar's letter.

In addition to certificates in categories I—VI listed in the above table, the Certification Board offers other provisional, supervisory, and administrative certificates to qualified applicants. The substitute Certificate requires (1) another valid certificate, (2) a bachelor's degree, or (3) two years teaching experience and evidence of a minimum of 60 semester hours of college credit, including 6 semester hours in professional education.

The above information on academic requirements for Illinois State Certificates is excerpted from the Office of the Superintendent of Public Instruction, Bulletin #70-01-125, dated September 1, 1967, of the Illinois State Teacher Certification Board. For additional information or clarification of any of the above, consult the Illinois State Teacher Certification Board.

## **Minimum Academic Requirements for a Temporary Certificate for Teaching in the Chicago Public Schools**

### **Elementary**

1. Bachelor's degree based on four years of training in a fully accredited college.
2. Fifteen semester hours in elementary education.

#### **A. For grades 3 to 8:**

Methods courses in at least two of the following must be included—arithmetic, language arts, science, and social studies.

#### **B. For kindergarten through primary grades:**

At least two of the following—kindergarten methods, beginning reading, early childhood education.

### **High School**

1. Bachelor's degree based on 4 years of training in a fully accredited college.
2. Eighteen semester hours in education, distributed according to the following mini-

mum semester credit hours are required for high school and grades 7 through 12 teacher examinations:

	<i>Hours</i>
A. American public education	2
B. Principles or philosophy of education	2
C. Adolescent or educational psychology	2
D. Methods of teaching in the secondary schools	2
*E. Student teaching in grades 7 through 12	5
F. Electives in professional education	0-5
	<hr/>
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*Note:* These requirements meet minimum standards of the State Office of Public Instruction and the North Central Association. Catalog descriptions will be consulted for consideration of equivalent courses with varying titles.

*Minimum subject-matter requirements for high school.*

A. Twenty semester hours in the following subject areas:

Accounting, art, business training, foreign languages, mathematics, music, physical education, stenography.

B. Twenty-four semester hours in the following subject areas:

Biology, chemistry, drafting, English, general science, geography, history, home-making arts, industrial education, physics.

C. Eighteen semester hours in library science.

*Note:* For specific distribution of hours in courses within each subject area consult the Board of Examiners, Chicago Public Schools.

*Trade and Vocational*

1. Five years of full-time employment in the trade of the certificate or three years of full-time employment in the trade of the certificate and a bachelor's degree from a fully accredited college.
2. Current approval of the State Board of Vocational Education.

*Evening Schools:* Same requirements as for teachers in the day schools.

The above information was excerpted from a bulletin of the Chicago Board of Education, Board of Examiners. All temporary certificates expire June 30th of the current school year. For any additional information or clarification of any of the above, consult the Chicago Board of Education.

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\*One year of successful teaching in grades 7 through 12 in an accredited school may be substituted for student teaching.

# The College of Engineering

GEORGE BUGLIARELLO, Sc.D., Dean of the College  
HERBERT J. STEIN, Ph.D., Associate Dean  
DAVID W. LEVINSON, Ph.D., Director of Industrial Liaison  
HENRY A. SETTON, M.Ed., Assistant Dean  
H. DALE WALRAVEN, M.A., Assistant Dean  
WILLIAM DEFOTIS, M.S., Assistant Dean

It is the purpose of the College of Engineering of the University of Illinois at Chicago Circle to educate men and women for professional work in engineering. The College offers the student a choice of various curricula which will prepare him for a career in one of the many diversified fields of engineering.

The curricula, or major fields, while diverse and specialized, are built upon a broad foundation in engineering sciences, mathematics, physics, and chemistry. The major fields are sufficiently basic and have enough in common to provide a wide range for career selection.

## The Major Fields of Concentration

A student seeking a Bachelor of Science degree, after his first year of enrollment and in periodic consultation with his adviser, selects from the following major fields of concentration the one that his interests and abilities indicate is appropriate:

Aerospace Science	Metallurgy
Applied Mechanics	Operations Research
Applied Physics	Soil Engineering
Bioengineering	Structural Design
Chemical Engineering	Structural Mechanics
Communications Engineering	Systems Analysis
Computer Science	Thermomechanical Engineering
Energy Conversion	Transportation Systems Engineering
Industrial Engineering	Urban Systems Engineering
Manufacturing Engineering	Water and Air Resources
Mechanical Analysis and Design	Wave Propagation and Radiation

## The Departments of the College of Engineering

The administrative structure of the College and its course offerings are organized according to the basic engineering functional areas of *energy*, *information*, *materials*, and *systems*.

### The Department of Energy Engineering

#### Professors

James P. Harnett, Ph.D., Head of the Department; Paul M. Chung, Ph.D.; Henry L. Garabedian, Ph.D.; Norman A. Parker, M.S.M.E.; Satish C. Saxena, Ph.D.

#### Associate Professors

Joseph C. F. Chow, Ph.D.; Chaim Gutfinger, Ph.D.; David S. Hacker, Ph.D.; John H. Kiefer, Ph.D.; Wolodymyr J. Minknowycz, Ph.D.; Harold A. Simon, Ph.D.; Stephen Szepe, Ph.D.

#### Assistant Professors

Aemer D. Anderson, Ph.D.; Allen C. Cogley, Ph.D.; Edward S. Pierson, Sc.D.; Kenneth L. Uherka, Ph.D.; Calvin J. Wolf, Ph.D.

Visiting Assistant Professor

V. M. K. Sastri, Ph.D.

#### Assistants

Anupam Bagchi, B.S.; William M. Bishop, B.S.; Ronald J. Bywater, B.S.; Samuel Hong-Ping Chen, B.S.; Henry M. Domanus, B.S.; Narasimham A. Ganti, B.S.; Barry L. Gilbert, B.S.; Pericles S. Koronakis, B.S.; K. C. Majumdar, B.S.; Thomas J. Marcisz, M.S.; M. L. R. Murthy, M.S.; Laird P. Roth, M.S.; Ho-Tien Shu, B.S.; Kunihiya Soda, M.S.; Pugalur Sudhindra, M.S.; Sang-Sin Yoo, M.S.; Eugene Y. J. Yuh, M.S.; Shu-Chien Yung, M.S.

### The Department of Information Engineering

Herbert J. Stein, Ph.D., Acting Head of the Department

#### Professors

James W. Dow, M.D.; Philip Parzen, Ph.D.

#### Associate Professors

Robert C. Arzbaecher, Ph.D.; Kurt Burian, Ph.D.; Earl E. Gose, Ph.D.; Derek P. Hendry, Ph.D.; Chathilingath K. Sanathanan, Ph.D.; Henry A. Setton, M.Ed.; Herbert J. Stein, Ph.D.; Bert L. Zuber, Ph.D.

**Assistant Professors**

George L. Brown, M.S.; Yun-Leei Chiou, Ph.D.; Roger C. Conant, Ph.D.; Rucelle L. Consigny III, Ph.D.; William Defotis, M.S.; John D. Ferguson, Ph.D.; Hitoshi Inada, Ph.D.; Sharadbabu R. Laxpati, Ph.D.; Chu-quon Lee, Ph.D.; Miljenko Orsic, Ph.D.; Roland Priemer, Ph.D.; Howard Prosser, Ph.D.; Devendar C. Reddy, Ph.D.; Thomas M. Smith, M.S.; Stephen Tsai, Ph.D.

**Instructors**

Robert A. Dell, Jr., M.S.; Philip L. Katz, M.S.; Jeffrey Levett, B.S.; Gerald A. Masek, M.S.; Allen A. Sandberg, M.S.

**Assistants**

Peter Biancalana, B.S.; Chi-Fa A. Chuang, B.S.; Marc B. Dennison, B.S.; Lawrence J. Grosskopf, B.S.; Larry W. Kirsch, B.S.; Paul L. Michaud, B.S.; Niva S. Oghigian, B.S.; John B. Picchietti, B.S.; Thomas E. Wachtor, B.S.

**The Department of Materials Engineering****Professors**

Ernest F. Masur, Ph.D., Head of the Department; David W. Levinson, Ph.D.; Thomas H. Blewitt, Sc.D.; William Rostoker, Ph.D.; John A. Schey, Ph.D.; Robert L. Schiffman, Ph.D.

**Associate Professors**

Robert F. Domagala, M.S.; James M. Doyle, Ph.D.; Gordon H. Geiger, Ph.D.; Roy B. Perkins, M.S.; Daniel F. Schoeberle, Ph.D.; Albert B. Schultz, Ph.D.; S. P. Shah, Ph.D.; Thomas C. T. Ting, Ph.D.; O. E. Widera, Ph.D.

**Assistant Professors**

Ted B. Belytschko, Ph.D.; Robert H. Bryant, Ph.D.; Sushil Chandra, Ph.D. (Visiting); Yao W. Chang, Ph.D.; Walter T. Feldt, Ph.D.; Mahmoud Khojasteh, Ph.D.; Donald G. Lemke, Ph.D.; Charles A. Moore, Ph.D.; Thomas M. Mulcahy, Ph.D.; Karl H. Otte, M.S.; Marshall L. Silver, Ph.D.; Chien-heng Wu, Ph.D.

**Instructors**

Peter A. Tuschak, M.S.

**Assistants**

Philip H. Abramowitz, M.S.; Olimpio Angeles, M.S.; Evangelos P. Dimopoulos, B.S.; George K. Karitos, B.S.; Nancy A. Holmes, B.S.; Jaw S. Lan, B.S.; Richard L. C. Leung, B.S.; William T. C. Li, M.S.; Lai-chih D. Lo, B.S.; Joseph A. Lobo, M.S.; Demetrios N. Maras, B.S.; Anal J. Mehta, B.S.; Rangaswamy G. Palaniswamy, M.S.; Jack R. Stein, B.S.; Wilfredo V. Venal, M.S.



### **Lecturers**

Clyde N. Baker, M.S.; Charles A. Timbo, Ph.D.; Peter Turula, Ph.D.; Adolf Walser, M.S.

## **The Department of Systems Engineering**

Leon N. Blair, B.S., Acting Head of the Department

### **Professors**

George Bugliarello, Sc.D.; Samuel E. Shapiro, B.S.; Edwin Thomas, Ph.D.; H. Dale Walraven, M.A.

### **Associate Professors**

Gyan C. Agarwal, Ph.D.; Leon N. Blair, B.S.; Richard C. Kohler, Ed.D.; William D. O'Neill, Ph.D.; Fred W. Schroeder, M.A.

### **Assistant Professors**

Edward J. Caldario, M.S.; M. V. J. Dembski, M.A.; Melvin Lehman, Ph.D.; Wayne A. Madsen, Ph.D.; Francis A. Mosillo, M.S.; Nancy L. Nihan, Ph.D.; Myron R. Rosenthal, Ph.D.; Joseph L. Schofer, Ph.D.; Martin Wachs, Ph.D.

### **Instructors**

Robert Pancner, B.S.

### **Graduate Assistants**

George Festas, B.S.; Ric Katilavas, B.S.; Leonard E. Schwer, B.S.

## **Bioengineering Program**

### **Professors**

James W. Dow, M.D., Head of the Program

### **Associate Professors**

Earl E. Gose, Ph.D.; Derek P. Hendry, Ph.D.; Bert L. Zuber, Ph.D.

### **Assistant Professor**

Jeffrey Levett, Ph.D.

## **Emeriti of the College**

### **Professors**

Clarence I. Carlson, B.S., General Engineering; Arnold C. Cobb, M.S.,

Thermodynamics; Joseph S. Kozacka, M.S., Mechanical Engineering; Frederick W. Trezise, M.A., Engineering Science, Associate Dean of the College.

### Associate Professors

Edward H. Coe, C.E.; Dee M. Holladay, B.S.

### Assistant Professors

Richard S. Royster, M.A.; Truman C. Buss, B.S.

## The Common Core Curriculum

The courses in the Common Core Curriculum are taken by each undergraduate engineering student, regardless of his major, for they provide the student with a broad base in mathematics, physics, chemistry and the engineering sciences. These are the courses of the first four quarters.

### First Year

#### *First Quarter*

	<i>Hours</i>
Mathematics 130—Analytic Geometry	5
Systems Engineering 151—Introduction to Engineering Design I	4
Chemistry 112—Chemical Bonding and Structure	4
Rhetoric 101—Freshman Rhetoric and Composition	4
Physical Education	(1)

#### *Second Quarter*

Mathematics 131—Calculus I	5
Systems Engineering 152—Introduction to Engineering Design II	4
Chemistry 113—Equilibria: Chemistry of Solutions	4
Rhetoric 102—Freshman Rhetoric and Composition	4
Physical Education	(1)

#### *Third Quarter*

Mathematics 132—Calculus II	5
Systems Engineering 153—Introduction to Engineering Design III	4
Chemistry 116—Structure and Reactivity (for engineers)	2
Physics 111—General Physics I (Mechanics)	4
Physical Education	(1)

### Second Year

#### *First Quarter*

	<i>Hours</i>
Mathematics 133—Calculus III	5
Materials Engineering 101—Engineering Mechanics I	3
Materials Engineering 142—Properties of Materials I	4
Physics 112—General Physics II (Mechanics, Thermodynamics)	5
Physical Education	(1)

*Additional Common Core Curriculum Courses* that must be taken by each undergraduate student in engineering, regardless of his major, follow. The quarter in which these courses are taken will depend on the major field the student has chosen.

Energy Engineering 201	4
Energy Engineering 211	4
Information Engineering 210	5
Information Engineering 219	4
Information Engineering 240	4
Materials Engineering 102	3
Materials Engineering 103	4
Materials Engineering 230	4
Mathematics 195	3
Mathematics 220	3
Physics 113	5
Physics 114	5

**Required Rhetoric and Humanistic-Social Science Courses**

A minimum of 8 quarter hours of rhetoric is required of all students in engineering.

An additional block of 24 quarter hours of electives in the humanities and the social sciences is included in all engineering curricula, together with a minimum 8 hours in the humanities and 8 hours in the social sciences that are required to fulfill the general education requirements of the University. Therefore, the College of Engineering requires the student to take at least two courses in a sequence from the recommended list in the social sciences and the humanities. To satisfy the 24 hour College requirement the student must take additional courses from the humanities and social science sequences listed below. With the consent of his adviser and the approval of the College Office, a student will be permitted to add other sequences or courses to the list.

**Humanities and Social Sciences Sequences**

<i>Humanities</i>	<i>Philosophy</i> 222
History of Architecture and Art 142, 143, 144	*Russian 101, 102, 103, 104, 105, 106
History of Architecture and Art 115	*Spanish 101, 102, 103, 104, 105, 106
English 101, 102, 103	<i>Social Sciences</i>
English 131	Anthropology 130, 150, 160
English 150, 151, 152	Economics 120, 121
*French 101, 102, 103, 104, 105, 106	Economics 120, 121, 324
*German 101, 102, 103, 104, 105, 106	Economics 120, 121, 329
History 110, 111, 112, 113	Geography 101, 102, 103
History 131, 132, 133	Geography 104, 105
	Geography 371

History 151, 152, 153	Political Science 150, 151
History 241, 242, 243	Psychology 100, 115
Humanities 101, 102, 103	Psychology 100, 130
Humanities 151, 152, 153	Rhetoric 251
Information Engineering 201	Sociology 100, 130
*Latin 101, 102, 103, 104, 105, 106	Sociology 100, 131
Music 130, 131	Sociology 346
Philosophy 101, 102, 103	Speech 100
Philosophy 150	Speech 111, 112, 113
*Students will not receive credit for 101, 102, 103 in a language taken in high school.	

## Elective Courses

All engineering curricula allot a block of 25 quarter hours to elective courses. These electives are both technical and nontechnical, and the student is expected to maintain a reasonable balance between them. Electives are selected in conference with the student's adviser. Students in the R.O.T.C. program are allowed 5 hours of credit if they complete the entire four-year program.

## The Mathematics and Chemistry Placement Tests

A new student who enters the College of Engineering must take the Mathematics Placement Test unless he has completed college-level work in algebra or trigonometry with a grade of D or above. Transfer students presenting such college-level credit are required to take the Mathematics Placement Test at the discretion of the Dean of the College of Engineering.

Students who present high school credit in chemistry must take the Chemistry Placement Test. Students with one year of high school chemistry and adequate preparation as shown by the placement examination take Chemistry 112. Students who have not had high school chemistry take Chemistry 111.

## Foreign Language Requirement

The College requires 2 units of entrance credit in foreign language. A student deficient in this requirement may be admitted, but he must, by not later than the end of his second year, remove the deficiency by completing the 101, 102, 103 sequence in any language taught at the University. Credit so earned does not count toward graduation.

## Physical Education Requirement

Each student must complete six quarter hours of credit in physical education unless he is a transfer student with 90 or more hours of credit or is a veteran, or is thirty years of age or older. This requirement should be completed within the first six quarters of attendance.

## Graduation Requirements

A total of 198 quarter hours of credit, exclusive of physical education, is required of all students seeking a degree in the College of Engineering. All of the general University requirements for graduation must also be met. See *General University Requirements*.

Satisfactory completion of these requirements leads to the degree of Bachelor of Science in Engineering with a major in one of the fields of concentration.

The engineering curriculum is designed to be completed in 12 quarters, usually covered in four calendar years. Many students, however, elect to take more than 12 quarters, with a reduced load in some or in all quarters. Extension of the graduation date may be avoided by attending four, rather than three, quarters per calendar year. However, in some cases the wise alternative may be to extend the graduation date.

## Transfer Students

The College of Engineering admits qualified transfer students from other institutions. With proper planning, a prospective transfer student may avoid losing appreciable time toward graduation.

Prospective transfer students should plan their program at the school they are currently attending as nearly as possible in accordance with the curriculum requirements stated in this Catalog. Since technical-course offerings are limited in some colleges, prospective transfer students may find it to their advantage to complete, at the college they are currently attending, some of the humanities and social science requirements, particularly during the freshman and sophomore years.

The prospective transfer student whose courses most nearly parallel the offerings at Chicago Circle in content and credit hours effects the transfer most easily. This is particularly true of courses in mathematics, physics, chemistry, and the elementary engineering sciences.

## The Major Fields of Concentration and the Required Courses

A block of 36 hours is allotted to the required courses in the student's major field of concentration. This provides in-depth knowledge in that field. The twenty-one major areas of concentration and the sequence of courses taken during a student's undergraduate years after the fourth quarter are listed in the following sections. *The major field courses are noted in capital letters.* See the Common Core Curriculum for the courses of the first four quarters.

### Aerospace Science

Concerned with preparing a student for participation in the aero-



space and related fields, the major, which includes the design and testing of rocket engines, spacecraft, jet engines, and aircraft, provides a solid background in the basic theory and experiments of fluid mechanics. Thus aerospace science offers preparation for graduate study.

Flexible and broadly based, the program relates to many professional areas, including aeronautical, mechanical, and civil engineering as well as to fluids and biofluids engineering. Examples of areas of specific application are airfoil design and analysis, low-drag shapes, flight control and stability, propulsion, aerodynamic noise, atmospheric reentry, design of blowers and pumps, fluid handling systems, blood flow and biological fluid transport.

The courses in the major sequence, which include lectures and laboratory demonstrations and organized experiments, provide an excellent base for either specializing or widening the student's areas of interest. Individual or group projects may also be arranged, utilizing the computer or the laboratory facilities as adjuncts.

## Second Year

<i>Second Quarter</i>	<i>Hours</i>
Mathematics 220—Elementary Differential Equations I	3
Materials Engineering 102—Engineering Mechanics II	3
Physics 113—General Physics III (Electricity and Magnetism)	5
Mathematics 195—Introduction to Automatic Digital Computing	3
Physical Education	(1)
<i>Third Quarter</i>	
Energy Engineering 201—Thermodynamics	4
Materials Engineering 103—Engineering Mechanics III	3
Information Engineering 219—Introduction to Electromagnetic Fields	4
Physics 114—General Physics IV (Wave Phenomena and Relativity)	5
Physical Education	(1)

## Third Year

<i>First Quarter</i>	<i>Hours</i>
Information Engineering 210—Introduction to Circuit Analysis	5
Materials Engineering 230—Properties of Materials II	4
Energy Engineering 211—Fluid Mechanics	4
Electives	
<i>Second Quarter</i>	
Information Engineering 240—Introduction to Electronics	4
ENERGY ENGINEERING 212—Potential Flow	4
MATERIALS ENGINEERING 204—Mechanics of Solids I	4
Electives	
<i>Third Quarter</i>	
ENERGY ENGINEERING 213—Compressible Flow	4

ENERGY ENGINEERING 221—Heat Transfer	4
MATERIALS ENGINEERING 208—Mechanical Vibrations	4

**Fourth Year**

<i>First Quarter</i>	<i>Hours</i>
ENERGY ENGINEERING 214—Viscous Fluid Mechanics	4
ENERGY ENGINEERING 241—Experimental Methods in Solid and Fluid Mechanics	4
MATERIALS ENGINEERING 206—Mechanics of Solids III	4
Electives	
<i>Second Quarter</i>	
One of the following:	
ENERGY ENGINEERING 313—Aerodynamics of Flight	4
ENERGY ENGINEERING 314—Propulsion	4
Electives	
<i>Third Quarter</i>	
Electives	

**Applied Mechanics**

This field represents one of the principal foundations of engineering science; therefore, the curriculum major in applied mechanics is designed to give the student a broad introduction to the scientific basis of much of modern engineering practice and research. Although graduates with this major should have no difficulty in entering a variety of positions in industry, applied mechanics has particular appeal to students with strong analytical or experimental research interests.

The required courses consist primarily of offerings in the Departments of Materials Engineering, Energy Engineering, and Mathematics, which introduce the student to the fundamentals of solid and fluid mechanics and to the mathematical tools needed for these disciplines. At the same time, because of the breadth of the subject matter covered in this major, a choice of areas of specialization in accord with his needs and interests is open to the student in his senior year.

**Second Year**

<i>Second Quarter</i>	<i>Hours</i>
Mathematics 220—Elementary Differential Equations I	3
Materials Engineering 102—Engineering Mechanics II	3
Materials Engineering 230—Properties of Materials II	4
Physics 113—General Physics II (Electricity and Magnetism)	5
Physical Education	(1)

*Third Quarter*

Mathematics 195—Introduction to Automatic Digital Computing	3
Materials Engineering 103—Engineering Mechanics III	3
Energy Engineering 201—Thermodynamics	4
Physics 114—General Physics IV (Wave Phenomena and Relativity)	5
Physical Education	(1)

**Third Year***First Quarter**Hours*

Energy Engineering 211—Fluid Mechanics	4
MATERIALS ENGINEERING 204—Mechanics of Solids I	4
Information Engineering 210—Introduction to Circuit Analysis	5

*Second Quarter*

MATHEMATICS 310—Higher Analysis I	4
ENERGY ENGINEERING 212—Potential Flow	4
Information Engineering 219—Introduction to Electromagnetic Fields	4
Electives	

*Third Quarter*

MATERIALS ENGINEERING 208—Mechanical Vibrations	4
INFORMATION ENGINEERING 240—Introduction to Electronics	4
MATHEMATICS 311—Higher Analysis II	3
Electives	

**Fourth Year***First Quarter**Hours*

MATERIALS ENGINEERING 316—Introduction to Continuum Mechanics	4
ENERGY ENGINEERING 214—Viscous Fluid Mechanics	4
Electives	

*Second Quarter*

MATERIALS ENGINEERING 303—Theory of Elasticity I	4
Electives	

*Third Quarter*

MATERIALS ENGINEERING 311—Intermediate Dynamics	4
Electives	

**Applied Physics**

This sequence of courses provides engineering students with a strong background in physics. It concentrates on fundamental topics for those students who intend to pursue a career in physics or in one of the physics-oriented areas of engineering.

**Second Year***Second Quarter*

	<i>Hours</i>
Materials Engineering 102—Engineering Mechanics II	3
Mathematics 220—Elementary Differential Equations I	3
Physics 113—General Physics III (Electricity and Magnetism)	5
Physical Education	(1)

*Third Quarter*

Mathematics 195—Introduction to Automatic Digital Computing	3
Materials Engineering 103—Engineering Mechanics III	3
Energy Engineering 201—Thermodynamics	4
Physics 114—General Physics IV (Wave Phenomena and Relativity)	5
Physical Education	(1)
Elective	

**Third Year***First Quarter*

	<i>Hours</i>
PHYSICS 221—Electricity and Magnetism I	4
PHYSICS 361—Thermodynamics	4
Information Engineering 219—Introduction to Electromagnetic Fields	4
Elective	

*Second Quarter*

PHYSICS 381—Modern Experimental Physics I	4
Information Engineering 210—Introduction to Circuit Analysis	5
Elective	

*Third Quarter*

PHYSICS ELECTIVE—one of the following:	
PHYSICS 323—Elementary Solid State Physics	4
PHYSICS 331—Nuclear Physics	4
PHYSICS 362—Thermal and Statistical Physics II	4
PHYSICS 371—Light (Wave Optics)	4
PHYSICS 382—Modern Experimental Physics II	4
Electives	

**Fourth Year***First Quarter*

	<i>Hours</i>
PHYSICS 301—Electricity and Magnetism I	4
PHYSICS 321—Quantum Mechanics	4
Information Engineering 240—Introduction to Electronics	4
Electives	

*Second Quarter*

PHYSICS 302—Electricity and Magnetism II	4
PHYSICS 322—Quantum Mechanics II	4

Energy Engineering 211—Fluid Mechanics	4
Electives	

### *Third Quarter*

PHYSICS Elective (See <i>Third Year, Third Quarter</i> )	4
Materials Engineering 230—Properties of Materials II	4
Electives	

## **Bioengineering**

A major sequence leading to the Bachelor of Science in Engineering with a major in bioengineering has been formulated to prepare students for graduate or medical school and for a wide variety of industrial positions. At present, bioengineers are sought by government, university, and hospital-associated laboratories and by a large industrial segment, including the aircraft, aerospace, pharmaceutical, medical electronics and automotive industries.

The bioengineering major is designed to balance a student's education in the basic engineering and biological sciences. In addition to the engineering core curriculum, students take advanced engineering and biological science courses as part of the prescribed major sequence and in the form of electives. Bioengineering courses and research projects offered through the Department of Information Engineering cover basic bioengineering science. These include the application of the theories of information, communication, and control to complex physiological systems; the use of artificial intelligence and pattern recognition; and applications of the digital computer in biology and medicine.

### **Second Year**

<i>Second Quarter</i>	<i>Hours</i>
Materials Engineering 102—Engineering Mechanics II	3
Mathematics 195—Introduction to Automatic Digital Computing	3
Mathematics 220—Elementary Differential Equations I	3
Physics 113—General Physics III (Electricity and Magnetism)	5
Physical Education	(1)

### *Third Quarter*

Information Engineering 219—Introduction to Electromagnetic Fields	4
Information Engineering 210—Introduction to Circuit Analysis	5
Materials Engineering 230—Properties of Materials II	4
Physics 114—General Physics IV (Wave Phenomena and Relativity)	5
Physical Education	(1)

### **Third Year**

<i>First Quarter</i>	<i>Hours</i>
Information Engineering 240—Introduction to Electronics	4



INFORMATION ENGINEERING 100—General Biology	4
Materials Engineering 103—Engineering Mechanics III	3
Energy Engineering 201—Thermodynamics	4

*Second Quarter*

INFORMATION ENGINEERING 212—Signal Processing	4
INFORMATION ENGINEERING 101—General Biology	4
Energy Engineering 211—Fluid Mechanics	4
Electives	

*Third Quarter*

INFORMATION ENGINEERING 311—Linear Systems Analysis	4
INFORMATION ENGINEERING 102—General Biology	4
Electives	

**Fourth Year**

<i>First Quarter</i>	<i>Hours</i>
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INFORMATION ENGINEERING 352—Biocontrol	3
INFORMATION ENGINEERING 353—Biocontrol Laboratory	3
INFORMATION ENGINEERING 383—Animal Physiology I	5

*Second Quarter*

INFORMATION ENGINEERING 284—Cellular Biodynamics	5
Electives	

*Third Quarter*

Electives

**Chemical Engineering**

The technology of using chemical and physical processes to transform naturally occurring raw materials into foods, pharmaceuticals, plastics, and other chemicals is the subject matter of this option. This major also includes nuclear processing, space engineering, energy conversion, systems engineering, materials science, bioengineering, and medicine.

During his studies at the University, the chemical engineering student will develop a thorough understanding of inorganic, organic, and physical chemistry and master the basic principles of the engineering sciences of fluid mechanics, heat transfer, thermodynamics, mass transfer, and chemical reaction engineering. Through elective courses, he also may acquire some grounding in control theory, optimization, and process design. He also may elect courses in chemistry to prepare for a career in pharmaceutical and food industries or in environmental technology.

Completion of the four year engineering program with a major in chemical engineering will prepare the graduate for employment in the chemical, petroleum, and allied industries or in the aerospace and metal-

lurgical industries. Should the student decide to continue his education, the chemical engineering curriculum will provide an excellent preparation for a graduate program in most other fields of engineering and of chemistry.

## Second Year

<i>Second Quarter</i>	<i>Hours</i>
Mathematics 220—Elementary Differential Equations I	3
Materials Engineering 101—Engineering Mechanics II	3
Physics 113—General Physics III (Electricity and Magnetism)	5
Mathematics 195—Introduction to Automatic Digital Computing	3
Physical Education	(1)

### *Third Quarter*

Energy Engineering 201—Thermodynamics	4
Materials Engineering 103—Engineering Mechanics III	3
Information Engineering 219—Introduction to Electromagnetic Fields	4
Physics 114—General Physics IV (Wave Phenomena and Relativity)	5
Physical Education	(1)

## Third Year

<i>First Quarter</i>	<i>Hours</i>
Information Engineering 210—Introduction to Circuit Analysis	5
Materials Engineering 230—Properties of Materials II	4
Energy Engineering 211—Fluid Mechanics	4
Electives	

### *Second Quarter*

Information Engineering 240—Introduction to Electronics	4
CHEMISTRY 233—Organic Chemistry I	5
ENERGY ENGINEERING 232—Chemical Process Analysis	2
Electives	

### *Third Quarter*

ENERGY ENGINEERING 231—Chemical Reaction Thermodynamics I	4
CHEMISTRY 340—Physical Chemistry I	3
CHEMISTRY 341—Physical Chemistry Laboratory I	2
Electives	

## Fourth Year

<i>First Quarter</i>	<i>Hours</i>
ENERGY ENGINEERING 234—Transport Processes	4
CHEMISTRY 342—Physical Chemistry II	3
CHEMISTRY 343—Physical Chemistry Laboratory II	2
Electives	

*Second Quarter*

ENERGY ENGINEERING 285—Diffusional Operations	4
CHEMISTRY 344—Physical Chemistry III	3
Electives	

*Third Quarter*

ENERGY ENGINEERING 386—Chemical Reaction Engineering	4
Electives	

**Communications Engineering**

In the communications engineering major the junior year provides a concise, modern approach to several areas of electrical engineering, including signal processing, linear analysis, introductory communication theory, electronics, and wave propagation and radiation. Senior-level work can be planned for specialization in at least one of the following areas:

Network Analysis and Synthesis	Electronic Applications
Communications Theory	Automatic Control Theory

The program offers sufficient versatility, through proper use of electives, for a student to prepare for immediate entry into industry or for admission to graduate school. This area of concentration is similar to the curricula in electrical engineering presented in many institutions. Graduates of this program have an almost unlimited variety of job opportunities in industry or government, in research, development, design, operations, sales, or administration.

**Second Year**

<i>Second Quarter</i>	<i>Hours</i>
Materials Engineering 102—Engineering Mechanics II	3
Mathematics 195—Introduction to Automatic Digital Computing	3
Mathematics 220—Elementary Differential Equations I	4
Physics 113—General Physics III (Electricity and Magnetism)	5
Physical Education	(1)

*Third Quarter*

Information Engineering 219—Introduction to Electromagnetic Fields	4
Information Engineering 210—Introduction to Circuit Analysis	5
Materials Engineering 230—Properties of Materials II	4
Physics 114—General Physics IV (Wave Phenomena and Relativity)	5
Physical Education	(1)

**Third Year**

<i>First Quarter</i>	<i>Hours</i>
Information Engineering 240—Introduction to Electronics	4

INFORMATION ENGINEERING 212—Signal Processing	4
Materials Engineering 103—Engineering Mechanics III	3
Energy Engineering 201—Thermodynamics	4
Electives	

### *Second Quarter*

INFORMATION ENGINEERING 311—Linear Systems Analysis	4
INFORMATION ENGINEERING 340—Intermediate Electronics	4
INFORMATION ENGINEERING 221—Introductory Electromagnetic Field Theory	3
Energy Engineering 211—Fluid Mechanics	4

### *Third Quarter*

INFORMATION ENGINEERING 312—Introduction to Communications Engineering	4
INFORMATION ENGINEERING 320—Introductory Wave Propagation and Transmission	5
INFORMATION ENGINEERING 342—Solid State Electronics	4
Electives	

## **Fourth Year**

### *First Quarter*

At least one of the following, for a total of 4 credit hours.

INFORMATION ENGINEERING 315—Intermediate Network Analysis
INFORMATION ENGINEERING 330—Communication Theory I
INFORMATION ENGINEERING 344—Electronic Applications I
INFORMATION ENGINEERING 360—Automatic Control Theory I
Electives

### *Second Quarter*

At least one of the following, for a total of 4 credit hours.

INFORMATION ENGINEERING 316—Introduction to Network Synthesis
INFORMATION ENGINEERING 331—Communication Theory II
INFORMATION ENGINEERING 345—Electronic Applications II
INFORMATION ENGINEERING 361—Automatic Control Theory II
Electives

### *Third Quarter*

Electives

## **Computer Science**

The major in computer science is a fusion of certain areas in electrical engineering (hardware) and mathematics (software). Beginning in the junior year the student studies certain of the subjects required in communications engineering, including courses in signal processing, linear

analysis, introductory communication theory, and electronics. At the same time, he is required to complete a block of mathematically oriented courses dealing with numerical analysis techniques and the theory of computing machines. The student may use his elective courses to emphasize, either in the hardware or software area, subjects of additional interest to him.

The versatility of this major also permits the student to prepare himself for various alternatives upon graduation. With the ascendancy of computer theory and techniques in modern technology, graduates of this program have roughly the same variety of job opportunities as those in communications engineering.

## Second Year

### *Second Quarter*

	<i>Hours</i>
Mathematics 220—Elementary Differential Equations I	3
Mathematics 195—Introduction to Automatic Digital Computing	3
Materials Engineering 102—Engineering Mechanics II	3
Physics 113—General Physics III (Electricity and Magnetism)	5
Physical Education	(1)

### *Third Quarter*

Information Engineering 219—Introduction to Electromagnetic Fields	4
Information Engineering 210—Introduction to Circuit Analysis	5
Materials Engineering 230—Properties of Materials II	4
Physics 114—General Physics IV (Wave Phenomena and Relativity)	5
Physical Education	(1)

## Third Year

### *First Quarter*

	<i>Hours</i>
Information Engineering 240—Introduction to Electronics	4
INFORMATION ENGINEERING 212—Signal Processing	4
MATHEMATICS 340—Modern Higher Algebra I	3
Energy Engineering 201—Thermodynamics	4
Elective	

### *Second Quarter*

INFORMATION ENGINEERING 311—Linear Systems Analysis	4
INFORMATION ENGINEERING 340—Intermediate Electronics	4
Energy Engineering 211—Fluid Mechanics	4
Elective	

### *Third Quarter*

Information Engineering 312—Introduction to Communications Engineering	4
Materials Engineering 103—Engineering Mechanics III	3
Electives	



**Fourth Year***First Quarter*

INFORMATION ENGINEERING 371—Computer Systems I	Hours 4
MATHEMATICS 387—Numerical Methods I	3
Electives	

*Second Quarter*

INFORMATION ENGINEERING 372—Computer Systems II	3
MATHEMATICS 388—Numerical Methods II	3
Electives	

*Third Quarter*

INFORMATION ENGINEERING 373—Computer Systems III	3
Electives	

**Energy Conversion**

The major treats the conversion of energy from one form to another and the control of energy in any form. Basic to the growth of industry, the control and conversion of energy thus become important to all engineers.

Engineers with a background in energy conversion are required for the power industry, which uses electric generating plants, electric power transmission systems, and many electromechanical control devices. Currently, the research and development of new or novel power systems for space applications are being conducted; techniques under consideration for different types of missions include magnetohydrodynamics, thermoelectrics, radioactive isotopes, and solar cells. Energy conversion engineers are studying improved high-speed transportation systems such as linear induction motors. Energy conversion also closely relates to pollution control, urban engineering, airplane power systems, new propulsion systems for automobiles, and motor and generator design. Because of its comprehensive coverage, energy conversion also provides a good background for general or consulting engineers.

The existing area of specialization stresses the various conversion devices involving electrical energy. The required courses supply background in electromagnetic field theory, electric circuits, electronics, and thermodynamics as preparation for courses treating discrete devices (motors, generators, solenoids, etc.), continuous devices (continuum electrodynamics, magnetohydrodynamics, electrogasdynamics), and novel or direct energy conversion devices (thermionics, thermoelectrics, fuel cells, magnetohydrodynamics, electrogasdynamics), and novel or direct energy conversion devices (thermionics, thermoelectrics, fuel cells, magnetohydrodynamics). The emphasis is on understanding the physical processes, using mathematics only as a tool.

Other optional areas to be added to the major are electrical power systems and nuclear energy. By including courses from other majors, energy conversion may serve as a basis for or adjunct to programs on high-speed transportation, pollution control, and urban engineering.

**Second Year**

<i>Second Quarter</i>	<i>Hours</i>
Mathematics 220—Elementary Differential Equations I	3
Materials Engineering 102—Engineering Mechanics II	3
Physics 113—General Physics III (Electricity and Magnetism)	5
Mathematics 195—Introduction to Automatic Digital Computing	3
Physical Education	(1)
<i>Third Quarter</i>	
Energy Engineering 201—Thermodynamics	4
Information Engineering 210—Introduction to Circuit Analysis	5
Information Engineering 219—Introduction to Electromagnetic Fields	4
Physics 114—General Physics IV (Wave Phenomena and Relativity)	5
Physical Education	(1)

**Third Year**

<i>First Quarter</i>	<i>Hours</i>
Energy Engineering 211—Fluid Mechanics	4
Information Engineering 240—Introduction to Electronics	4
Materials Engineering 230—Properties of Materials II	4
Materials Engineering 103—Engineering Mechanics III	3
Electives	
<i>Second Quarter</i>	
ENERGY ENGINEERING 202—Intermediate Thermodynamics	4
INFORMATION ENGINEERING 340—Intermediate Electronics	4
INFORMATION ENGINEERING 221—Introduction to Electromagnetic Field Theory	3
INFORMATION ENGINEERING 212—Signal Processing	4
Electives	
<i>Third Quarter</i>	
INFORMATION ENGINEERING 311—Linear Systems Analysis	4
INFORMATION ENGINEERING 320—Introductory Wave Propagation and Transmission	5
Electives	

**Fourth Year**

<i>First Quarter</i>	<i>Hours</i>
ENERGY ENGINEERING 351—Electromechanical Energy Conversion I	4
Electives	
<i>Second Quarter</i>	
ENERGY ENGINEERING 352—Electromechanical Energy Conversion II	4
Electives	

*Third Quarter*

ENERGY ENGINEERING 353—Direct Energy Conversion

4

Electives

**Industrial Engineering**

Concerned with the design, improvement, and installation of integrated systems of men, material, and equipment, industrial engineering draws upon specialized knowledge and skill in the mathematical, physical, and social sciences together with the principles and methods of engineering design to specify, predict, and evaluate the results to be obtained from such systems. By collecting, analyzing, and arranging such information, industrial engineers enable management to make decisions and to cope with existing problems. Industrial engineers also research and develop more effective techniques and systems for identifying and solving problems.

In order to design and operate effective and efficient systems, the industrial engineer must understand technology and complex man-and-machine systems. By taking courses in several areas including the Department of Systems Engineering and the College of Business Administration, the student acquires comprehensive knowledge about the quantitative, economic, and behavioral ingredients and processes of analysis and synthesis in design and in decision making.

The field traditionally associated with the study of industrial work methods now encompasses the application of the tools of systems analysis, operations research, and computer science. Industrial engineers function not only in all types of industry but also in service organizations, such as airlines, hospitals, and research groups. Government agencies also employ industrial engineers for methods and systems studies, administration, and project management.

**Second Year***Second Quarter**Hours*

Mathematics 220—Elementary Differential Equations I	3
Materials Engineering 102—Engineering Mechanics II	3
Materials Engineering 230—Properties of Materials II	4
Physics 113—General Physics III (Electricity and Magnetism)	5
Physical Education	(1)

*Third Quarter*

Mathematics 195—Introduction to Automatic Digital Computing	3
Materials Engineering 103—Engineering Mechanics III	3
ECONOMICS 120—Principles of Economics I	4
Physics 114—General Physics IV (Wave Phenomena and Relativity)	5
Physical Education	(1)

**Third Year**

<i>First Quarter</i>	<i>Hours</i>
Energy Engineering 201—Thermodynamics	4
Information Engineering 210—Introduction to Circuit Analysis	5
ECONOMICS 121—Principles of Economics II	4
MATHEMATICS 370—Introduction to Probability and Statistics	3
<i>Second Quarter</i>	
Energy Engineering 211—Fluid Mechanics	4
Information Engineering 240—Introduction to Electronics	4
SYSTEMS ENGINEERING 271—Introduction to Industrial Engineering I	4
MANAGEMENT 350—Organization and Administration	4
<i>Third Quarter</i>	
Information Engineering 219—Introduction to Electromagnetic Fields	4
SYSTEMS ENGINEERING 272—Introduction to Industrial Engineering II	4
MANAGEMENT 356—Operations and Systems Management I	4
Elective	

**Fourth Year**

<i>First Quarter</i>	<i>Hours</i>
SYSTEMS ENGINEERING 371—Optimization Techniques I	4
SYSTEMS ENGINEERING 350—Stochastic Processes	4
Electives	
<i>Second Quarter</i>	
Electives	
<i>Third Quarter</i>	
Electives	

**Manufacturing Engineering**

The manufacture of finished products involves interrelationships between machine design, machine control, fabrication, and service properties of materials as they relate to efficiency, productivity, quality, and cost. The courses are arranged to build upon the core courses in information, mechanical, materials, and energy sciences to ensure a comprehension of the manifold factors involved in a successful manufacturing process. The curriculum includes: (1) basic machine design principles associated with measuring and machine capability; (2) application of computer methods and related equipment to machine control; (3) influence of materials on the process and the process on materials; (4) selection of materials to meet service requirements; and (5) the relation of economics to materials and process selection.

This curriculum is aimed at educating engineers to enter the wide

spectrum of manufacturing industries engaged in producing finished components and assemblies of components which represent marketable products. The arrangement of courses in operations, design, and costing is therefore basic training for engineering supervision and plant management.

## Second Year

### *Second Quarter*

	<i>Hours</i>
Mathematics 220—Elementary Differential Equations I	3
Materials Engineering 102—Engineering Mechanics II	3
Materials Engineering 230—Properties of Materials II	4
Physics 113—General Physics III (Electricity and Magnetism)	5
Physical Education	(1)

### *Third Quarter*

Mathematics 195—Introduction to Automatic Digital Computing	3
Materials Engineering 103—Engineering Mechanics III	3
Energy Engineering 201—Thermodynamics	4
Physics 114—General Physics IV (Wave Phenomena and Relativity)	5
Physical Education	(1)

## Third Year

### *First Quarter*

	<i>Hours</i>
MATERIALS ENGINEERING 204—Mechanics of Solids I	4
Information Engineering 210—Introduction to Circuit Analysis	5
Energy Engineering 211—Fluid Mechanics	4
Elective	

### *Second Quarter*

Information Engineering 219—Introduction to Electromagnetic Fields	4
Electives	

### *Third Quarter*

Information Engineering 240—Introduction to Electronics	4
Materials Engineering 246—Numerical Control Processing	4
Electives	

## Fourth Year

### *First Quarter*

	<i>Hours</i>
MATERIALS ENGINEERING 360—Deformation Processing	4
MATERIALS ENGINEERING 209—Analysis and Synthesis of Mechanisms	4
Materials Engineering 249—Materials Processing IV	4
Electives	

### *Second Quarter*

MATERIALS ENGINEERING 244—Materials Processing II	3
MATERIALS ENGINEERING 361—Deformation Processing Laboratory	1



MATERIALS ENGINEERING 333—Design Use of Materials Electives	4
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*Third Quarter*

Materials Engineering 247—Manufacturing Cost Analysis or	3
Materials Engineering 384—Process Design	3
Materials Engineering 245—Materials Processing Laboratory II	1
Systems Engineering 271—Introduction to Industrial Engineering I Electives	4

**Mechanical Analysis and Design**

This major acquaints the student with the fundamental disciplines involved in the design of machinery. The engineering graduate with this option is likely to join one of many manufacturing industries.

In order to give the student a large choice in the selection of his future career as well as to enable him to keep up with developments in industry after graduation, the emphasis in this option is on fundamentals, which include the study of stress analysis, mechanical vibrations and mechanisms, and the design use of materials. A comprehensive design project incorporating these principles and completed by the student in his senior year summarizes and deepens his comprehension.

**Second Year**

<i>Second Quarter</i>	<i>Hours</i>
Mathematics 220—Elementary Differential Equations I	3
Materials Engineering 102—Engineering Mechanics II	3
Materials Engineering 230—Properties of Materials II	4
Physics 113—General Physics III (Electricity and Magnetism)	5
Physical Education	(1)

*Third Quarter*

Mathematics 195—Introduction to Automatic Digital Computing	3
Materials Engineering 103—Engineering Mechanics II	3
Energy Engineering 201—Thermodynamics	4
Physics 114—General Physics IV (Wave Phenomena and Relativity)	5
Physical Education	(1)

**Third Year**

<i>First Quarter</i>	<i>Hours</i>
MATERIALS ENGINEERING 204—Mechanics of Solids I	4
Energy Engineering 211—Fluid Mechanics	4
Information Engineering 210—Introduction to Circuit Analysis Electives	5

*Second Quarter*

MATERIALS ENGINEERING 209—Analysis and Synthesis of Mechanisms	4
Information Engineering 219—Introduction to Electromagnetic Fields	4
Electives	

*Third Quarter*

MATERIALS ENGINEERING 206—Mechanics of Solids III	4
MATERIALS ENGINEERING 208—Mechanical Vibrations	4
Information Engineering 240—Introduction to Electronics	4

**Fourth Year***First Quarter*

MATERIALS ENGINEERING 311—Intermediate Dynamics	Hours 4
Electives	

*Second Quarter*

MATERIALS ENGINEERING 313—Applied Dynamics	4
MATERIALS ENGINEERING 333—Design Use of Materials	4
Electives	

*Third Quarter*

MATERIALS ENGINEERING 283—Design Project in Mechanical Analysis and Design	4
MATERIALS ENGINEERING 241—Experimental Methods in Solids and Fluid Mechanics	4
Electives	

**Metallurgy**

The major in metallurgy combines studies of material science with the more important aspects of metallurgical engineering. Of the 36 quarter hours devoted to the major, approximately one half are devoted to studies of physical metallurgy, X-ray metallography, metallurgical thermodynamics, and metal physics; the remainder are devoted to a materials processing sequence which includes study of metalworking, powder metallurgy, welding and brazing, casting, and process control.

**Second Year***Second Quarter*

Mathematics 220—Elementary Differential Equations I	Hours 3
Materials Engineering 102—Engineering Mechanics II	3
Materials Engineering 230—Properties of Materials II	4
Physics 113—General Physics III (Electricity and Magnetism)	5
Physical Education	(1)

*Third Quarter*

Mathematics 195—Introduction to Automatic Digital Computing	3
Information Engineering 219—Introduction to Electromagnetic Fields	4
Energy Engineering 201—Thermodynamics	4
Physics 114—General Physics IV (Wave Phenomena and Relativity)	5
Physical Education	(1)

**Third Year***First Quarter**Hours*

MATERIALS ENGINEERING 250—Physical Metallurgy I	3
MATERIALS ENGINEERING 253—Physical Metallurgy Laboratory I	1
MATERIALS ENGINEERING 103—Engineering Mechanics III	3
Energy Engineering 211—Fluid Mechanics	4
Electives	

*Second Quarter*

MATERIALS ENGINEERING 251—Physical Metallurgy II	3
MATERIALS ENGINEERING 254—Physical Metallurgy Laboratory II	1
Materials Engineering 243—Metallurgical Problems	4
Information Engineering 210—Introduction to Circuit Analysis	5

*Third Quarter*

MATERIALS ENGINEERING 252—Physical Metallurgy III	3
MATERIALS ENGINEERING 255—Physical Metallurgy Laboratory III	1
Materials Engineering 248—Materials Processing III	4
Information Engineering 240—Introduction to Electronics	4
Elective	

**Fourth Year***First Quarter**Hours*

MATERIALS ENGINEERING 239—X-Ray Metallography I	3
MATERIALS ENGINEERING 360—Deformation Processing	4
Electives	

*Second Quarter*

MATERIALS ENGINEERING 244—Materials Processing II	3
MATERIALS ENGINEERING 361—Deformation Processing Laboratory	1
MATERIALS ENGINEERING 333—Design Use of Materials	4
Electives	

*Third Quarter*

MATERIALS ENGINEERING 245—Material Processing Laboratory II	1
Electives	

## Operations Research

A broad field of study including engineering, economics, and mathematics, operations research is concerned with providing a quantitative basis for predicting the behavior of complex, man-machine systems under a variety of alternative actions and assumptions, and in the context of uncertainty. Its methodologies may be classified in three general areas: optimization theory, statistical decision theory, and system simulation.

A characteristic of operations research problems is the large number of variables and interrelationships between variables which must be considered when modeling and analyzing complex systems. This distinguishes operations research from other engineering curricula. In order to treat such problems in a quantitative manner, the operations research major is exposed to a wide variety of analytic techniques which may be needed for studying large and complex engineering systems.

The operations researcher can expect to work on problems associated with equipment scheduling, inventory systems, vehicle routing, facility location, resource allocation and program planning, and competitive games. His approach might include collecting data about real systems, identifying problems and designing solutions to them, and testing those solutions with mathematical models of the systems. Operations researcher problems arise in industrial situations as well as in most large public systems, such as transportation, education, health care, and many others. In order to enhance his capability to deal with such systems, the student is encouraged to take elective courses in the social and life sciences, as well as in mathematics.

### Second Year

#### *Second Quarter*

	<i>Hours</i>
Materials Engineering 230—Properties of Materials II	4
Materials Engineering 102—Engineering Mechanics II	3
Mathematics 220—Elementary Differential Equations I	3
Physics 113—General Physics III (Electricity and Magnetism)	5
Physical Education	(1)

#### *Third Quarter*

Information Engineering 210—Introduction to Circuit Analysis	5
Physics 114—General Physics IV (Wave Phenomena and Relativity)	5
Mathematics 195—Introduction to Automatic Digital Computing	3
Materials Engineering 103—Engineering Mechanics III	3
Physical Education	(1)

### Third Year

#### *First Quarter*

	<i>Hours</i>
SYSTEMS ENGINEERING 311—Introduction to Systems Analysis I	4
ECONOMICS 120—Principles of Economics I	4
Information Engineering 219—Introduction to Electromagnetic Fields	4
MATHEMATICS 370—Introduction to Probability and Statistics	3

*Second Quarter*

SYSTEMS ENGINEERING 312—Introduction to Systems Analysis II	4
Information Engineering 240—Introduction to Electronics	4
Energy Engineering 201—Thermodynamics	4
ECONOMICS 121—Principles of Economics II	4

*Third Quarter*

Energy Engineering 211—Fluid Mechanics	4
SYSTEMS ENGINEERING 313—Introduction to Systems Analysis III	4
Electives	

**Fourth Year**

*First Quarter* *Hours*

SYSTEMS ENGINEERING 371—Optimization Techniques I	4
SYSTEMS ENGINEERING 350—Stochastic Processes	4
Electives	

*Second Quarter*

SYSTEMS ENGINEERING 372—Optimization Techniques II	4
Electives	

*Third Quarter*

Electives

**Soil Engineering**

Concerned with the use of soil and rock as an engineering material, soil engineering is a branch of civil engineering; as such, it carries a strong professional motivation. In an engineering organization the soil engineer has the responsibility for the analysis and design of earth structures, such as earth dams and embankments, and foundations for bridges, and retaining structures. The soil engineer is also responsible for the design of highway pavement systems.

In addition to the professional activities of the soil engineer, the subject has a strong and varied research potential, both basic and applied. Research activities vary from the study of the physics and chemistry of clay-water systems to the development of field measurement programs. Research in soil engineering has many interdisciplinary aspects, having direct and indirect applications in computer science, water resources, biomechanics, petroleum engineering, and the like.

The curriculum in soil engineering is designed for flexibility of course sequences. The required courses for the major provide a balanced program of theoretical soil mechanics, soil behavior, and foundation engineering. Beyond this, the student may, if he desires, concentrate in the following areas:

1. Microscopic Properties of soils—the study of soil composition from a



physiochemical viewpoint; the influence of microscopic properties on soil behavior.

2. Soil Behavior—the study of the engineering properties of soil and the influence of environmental conditions on the properties.
3. Theoretical soil mechanics—the study of the theories of soil mechanics; the physical basis for mathematical models; the engineering implications of theoretical results.
4. Foundation engineering—the study of principles and techniques of design of foundations for bridges and buildings; the design of earth dams and embankments; the design of highway pavement systems.

## Second Year

### *Second Quarter*

	<i>Hours</i>
Materials Engineering 102—Engineering Mechanics II	3
Mathematics 220—Elementary Differential Equations I	3
Energy Engineering 201—Thermodynamics	4
Physics 113—General Physics III (Electricity and Magnetism)	5
Physical Education	(1)

### *Third Quarter*

Mathematics 195—Introduction to Automatic Digital Computing	3
Materials Engineering 103—Engineering Mechanics III	3
Energy Engineering 211—Fluid Mechanics	4
Materials Engineering 230—Properties of Materials II	4
Physical Education	(1)

## Third Year

### *First Quarter*

	<i>Hours</i>
MATERIALS ENGINEERING 204—Mechanics of Solids I	4
Information Engineering 210—Introduction to Circuit Analysis	5
MATERIALS ENGINEERING 260—Soil Engineering I	3
Geological Sciences 370—Engineering Geology	4

### *Second Quarter*

Physics 114—General Physics IV (Wave Phenomena and Relativity)	5
MATERIALS ENGINEERING 261—Soil Engineering II	3
Information Engineering 219—Introduction to Electromagnetic Fields	4

### *Third Quarter*

MATERIALS ENGINEERING 262—Soil Engineering III	4
MATERIALS ENGINEERING 206—Mechanics of Solids III	4
Information Engineering 240—Introduction to Electronics	4
Electives	

## Fourth Year

### *First Quarter*

	<i>Hours</i>
MATERIALS ENGINEERING 341—Theoretical Soil Mechanics I	3

MATERIALS ENGINEERING 203—Composition and Properties of Concrete	3
MATERIALS ENGINEERING 344—Physical-Chemical Soil Behavior I	4
Electives	

*Second Quarter*

One of the following:

MATERIALS ENGINEERING 342—Theoretical Soil Mechanics II	4
MATERIALS ENGINEERING 345—Physical-Chemical Soil Behavior II	4
Electives	

*Third Quarter*

Electives

**Structural Design**

With the advent of the electronic computer, the function of the structural designer has undergone a profound change. Routine calculations, drafting, and other necessary chores are now largely delegated to nonengineers. The structural engineer, with the help of the computer, concentrates on the true job of "design"; i.e., the selection of the best possible solution to satisfy the needs of our society for housing, hospitals, factories, and bridges.

The structural design major incorporates these changes and prepares the student for his new role as a structural engineer. In addition to a brief introduction to the design practices and codes connected with various common structural materials such as steel and reinforced concrete, the primary emphasis is on acquainting the student with the fundamentals of structural theory, the properties of structural materials, and the use of the computer in the solution of problems in design. Recent developments in limit design and structural dynamics are also included.

**Second Year***Second Quarter*

	<i>Hours</i>
Mathematics 220—Elementary Differential Equations I	3
Materials Engineering 102—Engineering Mechanics II	3
Materials Engineering 230—Properties of Materials II	4
Physics 113—General Physics III (Electricity and Magnetism)	5
Physical Education	(1)

*Third Quarter*

Mathematics 195—Introduction to Automatic Digital Computing	3
Materials Engineering 103—Engineering Mechanics III	3
Energy Engineering 201—Thermodynamics	4
Physics 114—General Physics IV (Wave Phenomena and Relativity)	5
Physical Education	(1)

**Third Year**

<i>First Quarter</i>	<i>Hours</i>
Energy Engineering 211—Fluid Mechanics	4
MATERIALS ENGINEERING 204—Mechanics of Solids I	4
MATERIALS ENGINEERING 260—Soil Behavior I	3
Information Engineering 210—Introduction to Circuit Analysis	5

*Second Quarter*

MATERIALS ENGINEERING 205—Mechanics of Solids II	4
MATERIALS ENGINEERING 261—Soil Behavior II	3
Information Engineering 219—Introduction to Electromagnetic Fields	4
Electives	

*Third Quarter*

MATERIALS ENGINEERING 207—Structural Analysis I	4
Information Engineering 240—Introduction to Electronics	4
Electives	

**Fourth Year**

<i>First Quarter</i>	<i>Hours</i>
MATERIALS ENGINEERING 203—Composition and Properties of Concrete	3
MATERIALS ENGINEERING 221—Behavior and Design of Metal Structures I	3
Electives	

*Second Quarter*

MATERIALS ENGINEERING 321—Structural Analysis II	4
MATERIALS ENGINEERING 225—Design of Concrete Structures	4
Electives	

*Third Quarter*

MATERIALS ENGINEERING 324—Limit Analysis and Design of Structures	4
Electives	

**Structural Mechanics**

This major acquaints the engineering student with the fundamentals of structural theory on a broad basis. As a result, the engineering graduate with this option takes his place in a wide variety of industries in which structural components of ever-increasing complexity are being used. He may be expected to deal with structural problems involving airplanes, ships, bridges, and spacecraft.

The subjects covered include a thorough introduction to the mechanics of solids as well as structural analysis, vibrations, and experimental stress analysis. In addition to substantial training in mathematics, the student is also expected to complete a major design project in the area of his choice.

**Second Year***Second Quarter**Hours*

Mathematics 220—Elementary Differential Equations I	3
Materials Engineering 102—Engineering Mechanics II	4
Materials Engineering 230—Properties of Materials II	4
Physics 113—General Physics III (Electricity and Magnetism)	5
Physical Education	(1)

*Third Quarter*

Mathematics 195—Introduction to Automatic Digital Computing	3
Materials Engineering 103—Engineering Mechanics III	3
Physics 114—General Physics IV (Wave Phenomena and Relativity)	5
Energy Engineering 201—Thermodynamics	4
Physical Education	(1)

**Third Year***First Quarter**Hours*

MATERIALS ENGINEERING 204—Mechanics of Solids I	4
Energy Engineering 211—Fluid Mechanics	4
Information Engineering 210—Introduction to Circuit Analysis	5
Electives	

*Second Quarter*

MATERIALS ENGINEERING 205—Mechanics of Solids II	4
MATHEMATICS 310—Higher Analysis I	4
Information Engineering 219—Introduction to Electromagnetic Fields	4
Electives	

*Third Quarter*

MATERIALS ENGINEERING 206—Mechanics of Solids III	4
MATERIALS ENGINEERING 207—Structural Analysis I	4
MATERIALS ENGINEERING 208—Mechanical Vibrations	4
Information Engineering 240—Introduction to Electronics	4

**Fourth Year***First Quarter**Hours*

MATERIALS ENGINEERING 302—Applied Elasticity I	4
Electives	

*Second Quarter*

MATERIALS ENGINEERING 304—Experimental Stress Analysis	4
Electives	

*Third Quarter*

MATERIALS ENGINEERING 381—Design Project in Structural Mechanics	4
Electives	

## Systems Analysis

This curriculum provides an introduction to systems engineering and a broad basis for the analysis of complete engineering systems as distinguished from the components of such systems. The systems analysis major requires courses in analysis of lumped, distributed, discrete, and nonlinear systems, optimization techniques for design, and probability and statistics. In the analysis courses the student learns to develop and analyze mathematical models of complex engineering systems involving many forms of energy sources and other elements. Such problems are frequently encountered in aerospace, military, and other industrial systems.

Because of the increasing cost, complexity, and critical performance requirements of modern engineering systems the classical tools of design are no longer satisfactory. A design engineer today is faced with not only a design problem for a particular job, but also with the problems of designing an optimal system for cost and performance. The analog and digital computer methods of analysis and design of systems are emphasized throughout this curriculum.

The demand for systems analysts comes for NASA, from the Department of Defense, and from many other government agencies. It also comes from communications, computer, aerospace, chemical, and other industries. Many large organizations maintain special departments wherein systems analysts engage in research and development to improve existing operations and to suggest future endeavors.

### Second Year

#### *Second Quarter*

	<i>Hours</i>
Materials Engineering 230—Properties of Materials II	4
Materials Engineering 102—Engineering Mechanics II	3
Mathematics 220—Elementary Differential Equations I	3
Physics 113—General Physics III (Electricity and Magnetism)	5
Physical Education	(1)

#### *Third Quarter*

Mathematics 195—Introduction to Automatic Digital Computing	3
Materials Engineering 103—Engineering Mechanics III	3
Information Engineering 210—Introduction to Circuit Analysis	5
Physics 114—General Physics IV (Wave Phenomena and Relativity)	5
Physical Education	(1)

### Third Year

#### *First Quarter*

	<i>Hours</i>
SYSTEMS ENGINEERING 311—Introduction to Systems Analysis I	4
Energy Engineering 201—Thermodynamics	4
Information Engineering 219—Introduction to Electromagnetic Fields	4
MATHEMATICS 370—Introduction to Probability and Statistics	3



*Second Quarter*

SYSTEMS ENGINEERING 312—Introduction to Systems Analysis II	4
SYSTEMS ENGINEERING 321—Distributed Systems Analysis	4
Information Engineering 240—Introduction to Electronics	4
Energy Engineering 211—Fluid Mechanics	4

*Third Quarter*

SYSTEMS ENGINEERING 313—Introduction to Systems Analysis III	4
SYSTEMS ENGINEERING 325—Nonlinear Systems Analysis	4
Electives	

**Fourth Year**

*First Quarter* *Hours*

SYSTEMS ENGINEERING 371—Optimization Techniques I	4
SYSTEMS ENGINEERING 326—Discrete Systems Analysis	4
Electives	

*Second Quarter*

SYSTEMS ENGINEERING 372—Optimization Techniques II	4
Electives	

*Third Quarter*

Electives

**Thermomechanical Engineering**

The thermomechanical engineer is concerned with the design, development, manufacture, operation, and maintenance of power devices, such as turbines, internal combustion engines, reactors, fuel cells, and solar batteries. He is interested in heat transfer and combustion, heating and refrigeration, fluid handling equipment, vehicles of land, sea, and air, and the manufacture of boilers and furnaces. It is apparent from this wide gamut of activities that thermomechanical engineering provides one of the most varied branches of engineering.

Thermomechanical engineers are needed in electric generating plants to design and maintain the power generative equipment, such as combustion engines and nuclear reactors. They play a vital role in the aircraft industry, where they engage in research, development, and design. Working in close collaboration with aerospace, electrical, chemical, and metallurgical engineers, they tackle problems in supersonic flight and jet propulsion. In the automotive industry, thermomechanical engineers are involved in the design of internal-combustion engines, gas turbines, and other mechanical energy production and transmission devices. They are heavily in demand in the environment-control industries, where they design and develop a variety of heating and ventilating systems. There is also demand in the chemical industry, where they may be responsible for the design of power plants

and the maintenance of chemical process equipment.

A thermomechanical engineer is therefore indispensable to modern industry and transportation, and his future is limited only by the future of industry itself.

The program in thermomechanical engineering includes the fundamentals of physics and mathematics and courses in the engineering sciences, such as heat transfer, fluid mechanics, and thermodynamics. Applications and specialized courses in the senior year enable the student to prepare for a position in almost any industry or to pursue a graduate degree.

## Second Year

### *Second Quarter*

	<i>Hours</i>
Mathematics 220—Elementary Differential Equations I	3
Materials Engineering 102—Engineering Mechanics II	3
Physics 113—General Physics III (Electricity and Magnetism)	5
Mathematics 195—Introduction to Automatic Digital Computing	3
Physical Education	(1)

### *Third Quarter*

Energy Engineering 201—Thermodynamics	4
Materials Engineering 103—Engineering Mechanics III	3
Information Engineering 219—Introduction to Electromagnetic Fields	4
Physics 114—General Physics IV (Wave Phenomena and Relativity)	5
Physical Education	(1)

## Third Year

### *First Quarter*

	<i>Hours</i>
Information Engineering 210—Introduction to Circuit Analysis	5
Materials Engineering 230—Properties of Materials II	4
Energy Engineering 211—Fluid Mechanics	4
Electives	

### *Second Quarter*

Information Engineering 240—Introduction to Electronics	4
ENERGY ENGINEERING 202—Intermediate Thermodynamics	4
MATHEMATICS 321—Elementary Differential Equations II	3
Electives	

### *Third Quarter*

ENERGY ENGINEERING 221—Heat Transfer	4
ENERGY ENGINEERING 213—Compressible Flow	4
Electives	

## Fourth Year

### *First Quarter*

	<i>Hours</i>
ENERGY ENGINEERING 214—Viscous Fluid Mechanics	4

ENERGY ENGINEERING 241—Experimental Methods in Solid and Fluid Mechanics	4
Electives	

*Second Quarter*

ENERGY ENGINEERING 305—Statistical Thermodynamics	4
ENERGY ENGINEERING 321—Intermediate Heat Transfer	4
Electives	

*Third Quarter*

ENERGY ENGINEERING 281*—Design	4
Electives	

\*Substitution of Energy Engineering 392 is permitted for students with a B average or better, or by consent of the Department.

## Transportation Systems Engineering

The components that provide transportation services in urban areas make up one of the most complex and one of the most important systems in the city. While many aspects of the design of components for transportation technologies are now routine, it is becoming increasingly clear that there are a large number of critical problems related to such topics as demand analysis, optimizing location and design, and research on microscopic operational behavior of facilities that remain largely unsolved. The transportation systems engineering major is designed to educate engineers to be able to make the maximum contribution to the identification and solution of these problems. The curriculum, oriented toward analysis and some design experience, has been developed in recognition of the fact that the most challenging issues in urban transportation planning involve problem identification, model development, data collection and analysis, and macroscopic quantitative approaches to system synthesis. Introduction to a broad variety of ideas and skills will provide students with a firm foundation for future education in related areas. Some course material is drawn from mathematics and the social sciences; students will be encouraged to explore in some depth topics in economics, geography, sociology, political science, and psychology so that they may become more effective members of the transportation planning team. Course material in this program is structured to integrate these broad areas of study into a systematic framework.

Transportation will be examined as a complex process. Some of the topics to be considered are monitoring-system performance, problem identification and the derivation of objectives, microscopic analysis of the operation of system components, demand analysis, modeling human decision processes (such as choice of routes and mode of travel), and economic impact modeling.

Engineers majoring in transportation systems engineering will find employment with a large number of consulting and research firms, local, state, and federal government agencies, and manufacturers producing transportation hardware components.

**Second Year**

<i>Second Quarter</i>	<i>Hours</i>
Mathematics 220—Elementary Differential Equations I	3
Materials Engineering 102—Engineering Mechanics II	3
Materials Engineering 230—Properties of Materials II	4
Physics 113—General Physics III (Electricity and Magnetism)	5
Physical Education	(1)

*Third Quarter*

Mathematics 195—Introduction to Automatic Digital Computing	3
Materials Engineering 103—Engineering Mechanics III	3
ECONOMICS 120—Principles of Economics I	4
Physics 114—General Physics IV (Wave Phenomena and Relativity)	5
Physical Education	(1)

**Third Year**

<i>First Quarter</i>	<i>Hours</i>
Energy Engineering 201—Thermodynamics	4
Information Engineering 210—Introduction to Circuit Analysis	5
ECONOMICS 121—Principles of Economics II	4
SYSTEMS ENGINEERING 230—Transportation Systems Analysis I	3

*Second Quarter*

Energy Engineering 211—Fluid Mechanics	4
Information Engineering 240—Introduction to Electronics	4
MATHEMATICS 370—Introduction to Probability and Statistics	3
SYSTEMS ENGINEERING 330—Transportation Systems Analysis II	3

*Third Quarter*

Information Engineering 219—Introduction to Electromagnetic Fields	4
SYSTEMS ENGINEERING 380—Quantitative Methods in Urban Engineering	3
SYSTEMS ENGINEERING 350—Stochastic Processes	4

**Fourth Year**

<i>First Quarter</i>	<i>Hours</i>
SYSTEMS ENGINEERING 371—Optimization Techniques I	4
SYSTEMS ENGINEERING 332—Transportation Systems Planning	3
Electives	

*Second Quarter*

SYSTEMS ENGINEERING 360—Traffic Flow and Control Systems	3
Electives	

*Third Quarter*

SYSTEMS ENGINEERING 361—Evaluation of Engineering Systems	2
Electives	

Urban Systems Engineering

A program in urban systems engineering has been initiated to meet the growing need for specialists who are capable of treating the broad and complex problems associated with the development and operation of urban systems. Engineers are particularly well qualified to deal with some of these problems because many of them are directly related to the design of physical engineering systems. This major field is oriented toward training engineers in those ideas and skills that will be most appropriate for urban systems engineering in the coming years. Of particular importance is the variety of mathematical techniques that are required for analyzing, modeling, planning, and evaluating urban systems, their subsystems, and their components.

The series of courses in the urban systems major covers the structure and characteristics of existing urban systems and the characteristics of urban planning and development, processes, organizations, and institutions, both at the local and the national levels. Some courses in the major sequence are derived from mathematics and social sciences; additional courses in economics, sociology, psychology, geography, and political science will also be strongly recommended. Course material in urban systems will serve to integrate these diverse areas of study into a systematic framework. Several major analytic projects that require the student to engage in data collection, analysis, and synthesis will be included to develop the ability for independent work.

Throughout the program the major emphasis will be on the development of integrated systems of models of urban processes and the interaction of the human and engineering components of the urban system. For example, models of land development processes, housing-site selection, transportation-system demand and operation, goal formulation, and the perception of physical systems will be considered. Topics related to analytic planning will also be covered.

Engineers with a major in urban systems are in great demand by government at all levels and by consulting firms and research organizations. Many major aerospace firms, for example, are attempting to develop an internal capability in this field because of the large market potentials for their analytic skills and their hardware products.

Second Year

<i>Second Quarter</i>	<i>Hours</i>
Mathematics 220—Elementary Differential Equations I	3
Materials Engineering 102—Engineering Mechanics II	3
Materials Engineering 230—Properties of Materials II	3
Physics 113—General Physics III (Electricity and Magnetism)	5
Physical Education	(1)

*Third Quarter*

Mathematics 195—Introduction to Automatic Digital Computing	3
Materials Engineering 103—Engineering Mechanics III	3
ECONOMICS 120—Principles of Economics I	4



Physics 114—General Physics IV (Wave Phenomena and Relativity)	5
Physical Education	(1)

**Third Year**

<i>First Quarter</i>	<i>Hours</i>
Energy Engineering 201—Thermodynamics	4
Information Engineering 210—Introduction to Circuit Analysis	5
ECONOMICS 121—Principles of Economics II	4
SYSTEMS ENGINEERING 230—Transportation Systems Analysis I	3
<i>Second Quarter</i>	
Energy Engineering 211—Fluid Mechanics	4
Information Engineering 240—Introduction to Electronics	4
MATHEMATICS 370—Introduction to Probability and Statistics	3
SYSTEMS ENGINEERING 240—Urban Analysis I	3
<i>Third Quarter</i>	
Information Engineering 219—Introduction to Electromagnetic Fields	4
SYSTEMS ENGINEERING 350—Stochastic Processes	4
SYSTEMS ENGINEERING 355—Urban Systems Analysis II	3
Elective	

**Fourth Year**

<i>First Quarter</i>	<i>Hours</i>
SYSTEMS ENGINEERING 371—Optimization Techniques I	4
SYSTEMS ENGINEERING 356—Urban Systems Planning	3
Electives	
<i>Second Quarter</i>	
SYSTEMS ENGINEERING 380—Quantitative Methods in Urban Engineering	3
Electives	
<i>Third Quarter</i>	
SYSTEMS ENGINEERING 361—Evaluation of Engineering Systems	2
Electives	

**Water and Air Resources**

Concerned with the physics, chemistry, and fluid mechanics of man's environment, this option encompasses many courses usually associated with departments of meteorology and oceanography, but with special emphasis on the basic engineering principles necessary to analyze and control our geophysical environment. This major provides a broad educational background which will enable the graduate to pursue a career in such areas as weather modification, water and air pollution control, ecology (the in-

fluence of environmental changes on biological life), and related topics.

The graduate of this program can expect to find employment with private industry, federal government laboratories, and state and local governments, or he may continue on to graduate school. Opportunities in private industry range from companies interested in controlling their gaseous and liquid pollutants, on the one hand, to other industries concerned with oceanographic and earth satellite technology. Federal agencies, such as NASA and the Department of the Interior, need graduates to work on meteorological satellites for remote sensing of the earth's environment, weather modification through cloud seeding, and oceanographic problems involving the influence of sea currents on marine life. Employment opportunities also exist at the state and local levels, which in recent years have shown a strong interest in water and air pollution control.

Water and air resources is an interdisciplinary field that encourages electives in geology, physics, and biology, and in the engineering departments. Course subject material includes: fluid mechanics, atmospheric physics, oceanography, dynamic meteorology, hydrology, biology electives, and water wave phenomena.

Second Year

<i>Second Quarter</i>	<i>Hours</i>
Mathematics 220—Elementary Differential Equations	3
Materials Engineering 102—Engineering Mechanics II	3
Physics 113—General Physics III (Electricity and Magnetism)	5
Mathematics 195—Introduction to Automatic Digital Computing	3
Physical Education	(1)
 <i>Third Quarter</i>	
Energy Engineering 201—Thermodynamics	4
Materials Engineering 103—Engineering Mechanics III	3
Information Engineering 219—Introduction to Electromagnetic Fields	4
Physics 114—General Physics IV (Wave Phenomena and Relativity)	5
Physical Education	(1)

Third Year

<i>First Quarter</i>	<i>Hours</i>
Information Engineering 210—Introduction to Circuit Analysis	5
Materials Engineering 230—Properties of Materials II	4
Energy Engineering 211—Fluid Mechanics	4
Electives	
 <i>Second Quarter</i>	
Information Engineering 240—Introduction to Electronics	4
ENERGY ENGINEERING 212—Potential Flow	4
ENERGY ENGINEERING 215—Engineering Hydrology	4
Electives	

*Third Quarter*

ENERGY ENGINEERING 216—Oceanography	4
Electives	

**Fourth Year***First Quarter*

ENERGY ENGINEERING 214—Viscous Fluid Mechanics	4
ENERGY ENGINEERING 217—Introduction to Meteorology	4
Electives	

*Hours**Second Quarter*

ENERGY ENGINEERING 281—Design	4
ENERGY ENGINEERING 311—Free Surface Flow	4
Electives	

*Third Quarter*

ENERGY ENGINEERING 312—Porous Media	4
ENERGY ENGINEERING 282—Design	4
Electives	

**Wave Propagation and Radiation**

This major is very similar to the major in communications engineering. The significant difference is that the student majoring in wave propagation and radiation must complete, in his senior year, a sequence of courses that concentrate on electrodynamics, microwave device theory, and antennas and radiating systems. This major has the same attributes, with respect to versatility and job opportunities, as the major in communications engineering.

**Second Year***Second Quarter*

Materials Engineering 102—Engineering Mechanics II	3
Mathematics 195—Introduction to Automatic Digital Computing	3
Mathematics 220—Elementary Differential Equations I	3
Physics 113—General Physics III (Electricity and Magnetism)	5
Physical Education	(1)

*Hours**Third Quarter*

Information Engineering 219—Introduction to Electromagnetic Fields	4
Information Engineering 210—Introduction to Circuit Analysis	5
Materials Engineering 230—Properties of Materials II	4
Physics 114—General Physics IV (Wave Phenomena and Relativity)	5
Physical Education	(1)

**Third Year***First Quarter**Hours*

Information Engineering 240—Introduction to Electronics

4

INFORMATION ENGINEERING 212—Signal Processing

4

Materials Engineering 103—Engineering Mechanics III

3

Energy Engineering 201—Thermodynamics

4

*Second Quarter*

INFORMATION ENGINEERING 311—Linear Systems Analysis

4

INFORMATION ENGINEERING 340—Intermediate Electronics

4

INFORMATION ENGINEERING 221—Introductory Electromagnetic  
Field Theory

3

Energy Engineering 211—Fluid Mechanics

4

*Third Quarter*

INFORMATION ENGINEERING 342—Solid State Electronics

4

INFORMATION ENGINEERING 320—Introductory Wave Propagation  
and Transmissions

5

Electives

**Fourth Year***First Quarter**Hours*INFORMATION ENGINEERING 324—Wave Propagation and Radiation I  
Electives

4

*Second Quarter*INFORMATION ENGINEERING 325—Wave Propagation and Radiation II  
Electives

4

*Third Quarter*INFORMATION ENGINEERING 326—Wave Propagation and Radiation III  
Electives

4

# The College of Liberal Arts and Sciences

DEAN B. DONER, Ph.D., Dean of the College  
ELLIS B. LITTLE, Ed.D., Associate Dean  
VIVIAN C. LIPMAN, Ph.D., Acting Associate Dean  
PATRICIA A. MCFATE, Ph.D., Assistant Dean  
KENNETH E. BIDLE, Ph.D., Assisant Dean  
ALLEN H. HOWARD, Ph.D., Assisant Dean  
WADE A. FREEMAN, Ph.D., Assisant Dean

The College of Liberal Arts and Sciences supports and promotes the traditions of liberal scholarship and studies in its academic program. The College also offers service courses for other colleges and programs of professional and preprofessional education.

## **Curricula Offered by the College**

The College curricula permit students to broaden their knowledge through the general education requirements of the College and to concentrate within an academic discipline through the departmental requirements for the major.



## Academic Majors

Most of the students in the College choose their major from one of these academic disciplines:

Anthropology	Geography	Physics*
Biological Sciences	Geological Sciences	Political Science
Chemistry*	German	Psychology
Classics	History	Slavic Languages and Literatures
Criminal Justice, Administration of	Mathematics	Sociology
Economics	Music	Spanish
English	Philosophy	Speech
French		

\*Two degree programs are offered; consult the department listing.

## Preprofessional Programs

Students may also register for preprofessional work in one of the following areas (it is important that the student familiarize himself with the specific requirements of the school in which he plans to seek a professional degree):

Premedicine <sup>1</sup>	Preveterinary medicine
Pre dentistry	Medical record administration
Pre forestry	Medical technology
Prelaw <sup>2</sup>	Occupational therapy
Pre pharmacy	Preprofessional nursing
Pre journalism	

<sup>1</sup>The premedicine curriculum is a four-year program leading to a bachelor's degree. Students who enroll in this program choose an academic major and complete the usual graduation requirements.

<sup>2</sup>The College of the University of Illinois (at Urbana) requires a degree from an approved undergraduate college; this requirement may be waived by special action. Consult the Office of the Dean of the College of Law at Urbana. Some colleges of law admit students who have completed three years of college work. Consult the Office of the Dean of Law of the college in which enrollment is contemplated.

## Teacher Education

Students who are preparing to teach in secondary schools enroll in special curricula that are supervised by the departments offering the various majors. These programs, which differ in some respects, from those leading to a major, lead to a degree that qualifies a student to teach one of the following subjects in a secondary school:

Biological Sciences	Geography	Physics
Chemistry	German	Political Science
Earth Sciences	History	Sociology
English	Mathematics	Spanish
French		Speech

Complete details of the above programs are in the department sections of this catalog.

## Graduation Requirements of the College

Graduation requirements for the student in the College of Liberal Arts and Sciences are in three categories:

1. University requirements
2. College requirements
3. Department requirements

In addition, there are College restrictions on the courses and hours that a student may offer for a degree.

The graduation requirements are explained when the incoming student attends his advisement conference, which is scheduled when he enrolls. At this time, each student also has an opportunity to discuss his educational plans with an adviser who has been appointed by the College.

A freshman who has not chosen a field of specialization enters the general curriculum; his College adviser assists him in choosing the sequences and courses required for his degree. When he has earned 67 quarter hours of credit, he must choose a major. Thereafter, he consults his major department when he plans his program. This catalog, the College *Handbook for Majors and Prospective Majors*, and members of the College office staff are also sources of information. Ultimately, however, the student is responsible for meeting the College graduation requirements that were in effect when he entered and for fulfilling the regulations that were in force in his major department when he filed his declaration of a major.

If requirements are changed after he enters, he may elect to come under the new requirements. If courses originally required are no longer offered, the College has the prerogative of specifying acceptable substitutes.

*Residence:* Either the first 135 or the last 45 quarter hours of credit must be earned in uninterrupted residence on the Chicago Circle campus. *Work taken at the University of Illinois at Urbana does not satisfy this requirement.* Credit earned through proficiency examination may not be applied toward the minimum 45-hour residence requirement.

For students in the College of Liberal Arts and Sciences, study abroad and study off campus that have been approved by the student's major department and by the College are not considered an interruption of residence.

## College Requirements

### Rhetoric

During his first three quarters in residence a freshman is expected to complete two quarters of rhetoric—Rhetoric 101 and 102. If he does not receive a grade of B or better in Rhetoric 102, he is required to pass a rhetoric qualifying test before he receives his degree.

### Foreign Language

A reading knowledge equivalent to that which would result from two years of college work is the basic requirement. It may be fulfilled by completing a language sequence of courses numbered 100 through 106 or by passing a placement test or by passing a proficiency examination written by arrangement with the department involved. The following rules apply to the foreign language requirement for graduation:

1. Four years of high school credit in a single foreign language satisfies the requirement. A placement test is no longer required unless the student with four years of high school preparation in a language plans to do advanced work (beyond the second college year).
2. A transfer student with less than two years of college credit in a language *must* take a placement test if he plans to continue to work in that language.
3. If a student has less than four years of high school work in a foreign language, the requirement may be satisfied either by continuing the same language or by beginning another language in college. In either case, the equivalent of a 101-106 language sequence must be completed. If he begins a new language, he enrolls in a 101 course; if he continues the language he studied in high school, he *must* take a placement test.
4. The department's recommendation is based on the placement test results and determines the course in which a student registers. This applies to a transfer student with less than two years of credit in a language as well as to a student who is continuing his high school language. A transfer student who registers for a course that the placement test indicates but which duplicates previous college credit does not receive credit for the course; if his knowledge is weak, such placement may be to the student's advantage. If a transfer student ignores the recommendation of the department and registers for a more advanced course *for which he meets the prerequisites* based on his previous college credit, he does so at his own risk. If a student wishes to enroll in a course lower than his placement results indicate, he must secure permission from the department.
5. *If a student continues a language begun in high school*, credit is determined on the basis of *both* the placement test results and the amount of high school work, as per the following:

A student receives credit for a 101 course *only* if he both places in a 101 course and presents no more than two years of high school credit in that language. A student presenting three years of high school credit in a language receives credit for the course in which he places *only* if it is not below the 102 level. A student with four years of high school work in a language . . . . *for credit* the course in which he places *only* if that course is not below the 104 level.

6. Registration on a "no credit" basis requires the consent of both the language department and a dean.
7. The foreign language requirement *must be completed by the end of the junior year*. The sole exception is the transfer student, one admitted to the College with more than 45 quarter hours; he registers for a foreign language every quarter until he has satisfied the graduation requirement.
8. Students whose performance on the placement test indicates assignment to a more advanced course than would normally be expected may receive some college credit. See the College of Liberal Arts and Sciences *Handbook for Majors and Prospective Majors* for details.

## General Education Sequences

The general education program introduces the student to three categories of knowledge—natural sciences, humanities, and social sciences. Approved courses work is required in each of the categories. A student may not fulfill more than one category in a single department. No more than 12 hours taken in the major department may be applied toward general education credit; a course taken to satisfy the requirements for a minor may not be additionally offered to fulfill a general education requirement, collateral requirements in the major program, a related field, or a minor field of specialization.

General education sequences consist *only* of the approved courses and/or approved options listed below. *Note:* It is possible, where indicated, to apply independent study and/or general education colloquia credit toward the categories. In addition, any 100-level or 200-level honors course may be applied toward general education credit for James Scholars.

## General Education Sequences\*

Humanities—12 hours		Social Sciences—12 hours	
Classics:	100, 155, 165, 200, 205, 211, 215, 249, 250	Anthropology: (A, B, or C)	+A. 130, 150, 160 (formerly 104, 102, 103) (in any order)
In Translation (any 3)	201, 202, 203, 205, 210, 211, 215, 220, 225, 275, 299	B.	Anth. 160, Soc. 100, Psych. 100 (in any order)
Greek (any 3)	201-207, 211, 250, 251, 252, 299, 301-304, 310, 350, 360, 361, 370	+C.	160, 215, and one of 261, 263, 264, 265 (160 and 251 are prerequisite for others <i>only</i> when any of the latter are taken for general education credit)
Latin (any 3)			
English:	A. 101, 102, 103		
(A, B, or C)	B. 150, 151, 152 C. 190, 191, 192		
French:	A. 161, 162, 163 (the same as History 161, 162, 163)	Criminal Justice:	+101, 251, and one course from any other social science area
(A, B, or C)	B. 201, 202, 203 C. Any 3 300-level courses		
French, German, Spanish:	Fr. 185, Ger. 185, Span. 185 (renumbered from Fr. 216, Ger. 216, Span. 240 or 241)	Economics:	120, 121, and one from 324, 325, 326, 327, 328, 330-334, 398, 399, Finance 340
German:	+185, 221, 290, 292, 294, 370, 372, 374, 382	Geography:	+104, 105, 114, 123, 196, 197, 198, 204, 205, 221, 225, 331, 333, 334, 336, 338, 361, 363, 365, 371, 375, 377 (Note: †375 and 377)
History:	Any 12 hours below the 400 level (except 151, 152, 153, 365, 366, 372); 300-level courses require the consent of the instructor for general education credit	History: (A or B)	+A. 151, 152, 153 +B. 365, 366, 372
(Continued)		(Continued)	



Humanities (Continued)		Social Sciences (Continued)	
HAA:		Political Science:	150, 151, and any 200-level course (except 250 and 299)
Humanities:		Psychology:	100 or 102, and any 100-level course, plus any 200-level course (total of 3 courses)
(A, B, or C)		Sociology:	+A. 100, 130, 131
Music:		(A, B, or C)	B. 100 and two 100-level anthropology courses
A. 130, 131, and one from 215-220 or 289&		Speech/Theatre:	+C. 215, 225, 231, 232, 271, 276
B. One of the following combined with 8 hours from other humanities area(s) designated +: 130, 215-220, 289&		<b>Natural Sciences—20 hours</b>	
Philosophy:		Biology:	+100, 101, 102 (in any order)
12 hours from any 100 and/or 200-level courses (except that 102 and 211 cannot both be taken for general education credit)		Chemistry:	+112, 113, 114, 117, 118, 119, 121
A. Russian 221, 222, 223		Geography:	+101, 102, 103
B. Russian 224, 299, 324		Geology:	+101, 102, 103, 110, 204, 205, 206, 218, 219, 220, 230, 240
Slavic Lang. and Lit.: (A or B)		Mathematics:	+any course numbered 110 and above (except 170, 171, 172)
Spanish:			+115, 116, 117
(A, B, or C)		Physical Science:	+101, 102, 103
†A. 240, 241, 242		Physics:	101, 102, 103
†B. 218, and 219, with 221 or 222			
†C. Any 3 from the following: 221, 222, 223, 224			
Speech/Theatre			
+121, 122, 123			

Note: Students must meet the prerequisites for all general education courses.

\*A general education sequence can be chosen only from these approved courses and/or options.

†These sequences of less than 12 hours are accepted in fulfillment of the general education requirement in the category.

+These courses may be taken *singly*. Courses taken singly may be combined *only* with courses from the same or other area(s) within the category offering the single-course option.

&Music 289 is cross-listed as HAA 289 and Humanities 289.

**Transfer Credit in General Education**

If a transfer student has not completed comparable sequences elsewhere, he is required to satisfy the general education patterns listed below. Courses and/or sequences transferred must be equivalent to those in the general education sequences in the additional requirement.

**General Education Patterns for Transfer Students**

<i>Category</i>	<i>Transfer Credit</i>	<i>Additional Requirements</i>	<i>Minimum Hours Required</i>
Humanities	3 semester hours (4½ quarter hours) of humanities survey	Two approved* courses (8 quarter hours) in sequence† in the humanities category (any area)	12
Natural Sciences	3 semester hours of biology survey		20
	6 semester hours of biology		
	3 semester hours of physical science survey	Additional approved* work in any area(s) of natural sciences to total 20 hours	
	6 semester hours of physical science		
Social Sciences	3 semester hours of social science survey	Two approved* courses in sequence† in any area (s) of social science	12
	6 semester hours of social sciences survey or 6 other hours of social science in sequence	Any approved* course in any area of the social sciences	

\*Approved courses are those listed in the general education sequences and in the approved single courses. See General Education Sequences table.

†Sequences are defined as those approved courses and/or options listed in the general education sequences. See General Education Sequences table.

**The Major**

When he has earned 67 hours in the College, a student selects a field of specialization—his major. Requirements for the majors are stated in the department listings. At least 20 hours of the major requirements must be taken in upper-division courses, 12 hours of which must be taken while the student is in residence. The minimum number of hours for a major is 36. The maximum number of hours for major in one department is 60. Some

departments require supplementary work up to 48 hours; however, the total major and supplementary hours required may not exceed 108.

## **The Minor**

Students entering the College or declaring majors after September 1, 1969, are not required to elect a minor; however, a Liberal Arts and Sciences student who so desires may graduate with a minor field of specialization not to exceed 32 hours, of which at least 12 must be at the 200 or 300 level (except in a foreign language where 8 hours must be at the 200 or 300 level). When a student elects a minor field of specialization, the program of study in that field must be developed and approved by an adviser in the department of the minor field of specialization. Successful completion of a minor field of specialization will be noted on the student's diploma and transcript. Work in the minor field of specialization may be taken in one department only. The department in which the student chooses a minor field may specify that at least 8 advanced hours must be taken in residence. Courses taken to satisfy the requirements of the minor may not also be offered to fulfill a general education requirement, a collateral requirement in a major program, or a related field requirement.

Revisions of the residence rules for the minor for students who entered the College before September 1, 1969, and/or who declared a major previous to that date:

1. At least 8 hours of the minor must be taken in residence (unless the major department waives the residence requirement).
2. If the minor is a split minor, at least 4 hours in each field must be taken in residence (unless the major department waives the residence requirement).

## **The Related Field**

The College does not require work in a related field for graduation; however, some departments include such a requirement in their degree programs. When such a requirement exists:

1. It must consist of at least 22 hours of work in the related field.
2. It may not exceed 32 hours of work in the related field.
3. With the exception of work in foreign languages, departmental requirements in a related field must include at least 12 hours of work in upper-division (200-300 level) courses; 8 hours of such work are sufficient in the foreign languages.
4. At least 8 hours of the related field must be taken in residence (unless the major department waives the residence requirement).

## Advanced Hours

Of the 180 quarter hours (excluding basic military science and required physical education courses) that a student is required to earn for a degree, at least 45 hours must be in 200-level or 300-level courses, taken after a student achieves junior standing, that is, after he has earned 90 or more quarter hours.

## Limitations on Courses and Hours

*Independent Study.* No more than 32 hours of credit in courses titled "Independent Study" or "Independent Research" may be offered toward the degree.

*Electives.* Any course offered in the College of Liberal Arts and Sciences that is not required for the student's degree may be used as a free elective.

## Credit for Courses Taken Outside the College

No more than 48 hours of credit (unless the student is majoring or minoring in economics) earned in courses not covered by Liberal Arts and Sciences curricula within or outside the University may be counted toward a degree without the approval of the Dean of the College of Liberal Arts and Sciences and the major department. The right to review specific courses is reserved to the Dean and the major department. (See "Total Hours" in the Liberal Arts and Sciences *Handbook for Majors and Prospective Majors* for additional information about transfer credit.)

The Dean of the College may accept (within the 48 hour maximum) up to 12 hours of such work toward graduation. A student's major department may subsequently accept additional credit hours toward graduation up to the 48-hour maximum.

*Students in Approved Teacher Education Curricula* may apply the 28 hours of required education courses toward the total hours required for graduation.

*Students Who Are Not in Teacher Education Programs* but who have credit in education courses may use such credit as follows:

Education 170 credit hours may be used toward graduation.

Up to a maximum of 12 *additional* hours earned in education courses may be offered for graduation credit *if the major department approves*.

With the exceptions noted above, the department determines for its students which credits earned outside the College will be acceptable toward graduation.



## The General Curriculum and the Teacher Education Curricula for Teaching in Secondary Schools

*The General Curriculum* of the College provides the framework within which the majority of Liberal Arts and Sciences students complete the courses required for the degree of Bachelor of Arts.

*The Teacher Education Curricula* offer programs, leading to the baccalaureate degree and to preparation for certification at the secondary level, in the Departments of Biological Sciences, Chemistry, English, French, Geography, Geological Sciences, German, History, Mathematics, Physics, Political Science, Sociology, Spanish, and Speech and Theatre. The teacher education student must meet all of the general College requirements for graduation and must select a major field on admission to the program at the beginning of his junior year. In consultation with his adviser for his major he may also choose a minor field.\* Specific course requirements for teacher education majors and minors are listed under the departments. In addition to these requirements, all students in all secondary education curricula must complete Psychology 100, Political Science 151, and Education 170, 210, 250, and 270.

To register in a teacher education curriculum a student must have at least a 3.500 average at the end of his sophomore year.

Requirements for the major and the minor areas of specialization for those preparing to teach in secondary schools are in the department sections.

See also *Illinois State Teachers Certificate Requirements*.

\*The Department of Political Science requires an approved teaching minor for students who major in teacher education in political science.

## Pass-Fail Grade Option

A system of pass-fail grading for the College of Liberal Arts and Sciences has been approved for a trial period of four years beginning with the fall quarter, 1969, in the hope that students will be encouraged to explore areas of interest which they might otherwise avoid because of the possibility of low grades, and in anticipation that some of the anxieties of adjustment and grade competition will be reduced.

A summary of regulations that apply to the pass-fail grade option follows. Students who elect the pass-fail option should consult the Liberal Arts and Sciences *Handbook for Majors and Prospective Majors* for complete details.

1. Any full-time undergraduate student in good standing may elect the pass-fail option.
2. A maximum of 12 courses taken under the pass-fail option may be counted toward a degree. No more than one course per quarter may be taken under this option.
3. No more than two courses may be taken in one department under the pass-fail option.



4. Instructors will not be informed as to which students have elected the pass-fail option. The Office of Admissions and Records will convert the instructor's grade to P (pass) or F (fail).
5. Grades of D or better will be considered passing.
6. Any College of Liberal Arts and Sciences lower or upper division course, including those in rhetoric and general education and excluding those designated by name or area by major departments for satisfying the major, may be chosen under the pass-fail option.
7. A student registered in a college other than Liberal Arts and Sciences may not elect the pass-fail option unless his own college offers such an option.
8. A Liberal Arts and Sciences student registered in a course offered by another college may not use the pass-fail option in that course unless that college offers the pass-fail option.

## **The Administration of Criminal Justice**

Arthur J. Bilek, M.S.W., Director of the Curriculum

### **Professors**

Arthur J. Bilek, M.S.W.; A. C. German, D.P.A. (Visiting); Joseph D. Nicol, M.S.

### **Associate Professors**

James T. Carey, Ph.D.; Duayne J. Dillon, M.S.; Stephen A. Schiller, J.D.; John A. Webster, M.S.

### **Assistant Professors**

Harry W. Schloetter, M.S.W.

### **Instructors**

Larry Tift, M.A.

The degree of Bachelor of Arts is awarded to students who fulfill the general University and College of Liberal Arts and Sciences graduation requirements, and successfully complete the Curriculum in the Administration of Criminal Justice.

The curriculum provides an academic and philosophical approach to the study of criminal justice and law enforcement by critically examining and interrelating material from sociology, political science, history, public administration, philosophy, and psychology.

The program is designed for students planning a career or graduate study in law enforcement, police administration, criminal law, corrections, criminalistics,

probation and parole, criminology, or delinquency. Undergraduates and persons presently working in police and correction agencies may enroll.

*Major*—43 hours, distributed as follows:

Sociology 100

Psychology 100

Criminal Justice 101, 251, 351, 352, 353

16 hours of criminal justice courses, chosen with the consent of the adviser, at the 200 and 300 level.

*Required Prerequisite and Collateral Courses*—36 or 37 hours distributed as follows:

Criminal Justice 231

Sociology 131, 225, 276

Political Science 150, 151, 205

Psychology 110

*Minor*—A student majoring in an area other than the administration of criminal justice who feels that a *minor in criminal justice* would broaden his understanding of criminal law and its operation in our society must take 27 hours, of which 19 must be at the 200 and 300 level, distributed as follows:

Criminal Justice 101, 251, 351, 352, 353

8 additional hours of courses in criminal justice at the 200 and 300 level, chosen with the consent of his adviser.

## Anthropology

### Professors

Charles A. Reed, Ph.D., Acting Head of the Department

### Associate Professors

Laura A. Bohannon, Ph.D.; Robert L. Hall, Ph.D.; Jack H. Prost, Ph.D.; William A. Shack, Ph.D.

### Assistant Professors

Constance E. Cronin, Ph.D.; Susan T. Freeman, Ph.D.; Merwyn S. Garbarino, Ph.D.; McGuire Gibson, Ph.D. (Adjunct); James L. Phillips, Ph.D.; Stephen L. Schensul, Ph.D. (Adjunct); Charles P. Warren, M.A.

*Major*—for the degree of Bachelor of Arts, 52 hours, distributed as follows:

Anthropology 130, 150, 160, 200, 213, 231, 245, 270, and 20 hours of courses in anthropology at the 200 level or above.

A major interested in a subdivision of anthropology (social, physical, archaeological, or linguistic) must arrange a suitable program of electives with his adviser. Each major is assigned a departmental adviser.

*Departmental Distinction:* A candidate must be eligible for College Honors, meet all the requirements for a major in anthropology, and satisfactorily complete a thesis in Anthropology 299. A student who elects a minor in anthropology may also, with the consent of the department, be awarded distinction upon satisfactory completion of Anthropology 299.

*Minor*—Students from other departments who wish to minor in anthropology must take Anthropology 130, 150, 160, and 20 hours of courses in anthropology at the 200 level or above, chosen in consultation with an adviser assigned by the Department of Anthropology.

## Biological Sciences

### Professors

John O. Corliss, Ph.D., Head of the Department; Theodore J. Starr, Ph.D., Associate Head of the Department; Sidney F. Glassman, Ph.D.; Bernard Greenberg, Ph.D.; Helene N. Guttman, Ph.D.; Marion T. Hall, Ph.D. (Adjunct); Robert F. Inger, Ph.D. (Adjunct); Jiri Lom, Ph.D. (Research); Kenneth M. Madison, Ph.D.; Albert S. Rouffa, Ph.D.; William Sangster, Ph.D.; Max C. Shank, Ph.D.; Stanley K. Shapiro, Ph.D.; Rolf Singer, Ph.D.; Eliot B. Spiess, Ph.D.

### Associate Professors

Elmer B. Hadley, Ph.D., Acting Head of the Department 1969-1970; David Bardack, Ph.D.; Howard E. Buhse, Ph.D.; Donald A. Eggert, Ph.D.; M. A. Q. Khan, Ph.D.; David B. Mertz, Ph.D.; Darrell L. Murray, Ph.D.; Halina J. Presley, Ph.D.; David Shomay, Ph.D.; Charles N. Spirakis, Ph.D.; Thomas N. Taylor, Ph.D.; Robert B. Willey, Ph.D.

### Assistant Professors

Louise Anderson, Ph.D.; James A. Bond, Ph.D.; Satish Chandran, Ph.D.; Shepley S. C. Chen, Ph.D.; Michael R. Cummings, Ph.D.; Merrill Gassman, Ph.D.; Manuel Goldman, Ph.D.; Harold W. Kerster, Ph.D.; John A. Nicolette, Ph.D.; David Penney, Ph.D.; Thomas W. Seale, Ph.D.; Phebe Van Valen, Ph.D.; Ruth L. Willey, Ph.D.

### Instructors

Elizabeth Deis, M.S.; James F. Janicke, M.S.; Michael B. Maddock, M.S.; Marlen F. Mahoney, M.A.; Paul J. Taxey, M.A.; Mohammed Younus, M.A.

### Research Associate

V. T. Ramakrishnan, Ph.D.

### Assistants

Vimal R. Advani, M.S.; Jared L. Beard, B.S.; Maribeth Babler, B.S.; Sheila Brack, M.S.; Gary R. Braslawsky, B.S.; Anita C. Bukowiecki, B.A.; James S. Burns, B.S.; Diane Chambliss, B.A.; Lin-Li Chang, B.S.; Carol A. Chodzko, B.S.; Sun-Jin Choih, M.S.; Sandra J. Dinning, B.S.; Carole D. Dougherty, B.S.; Elisa M. Durban, B.S.; Harold O. Eiler, B.S.; David G. Ford, B.S.; Emily Goldberg, B.S.; Kenneth R. Groh, B.S.; Barbara Haux, D.D.S.; Arthur F. Hirsch, B.S.; James R. Jennings, B.S.; Charmayne J. Jesik, M.A.; Ahmad Kamal, M.A., M.S.; Eric E. Karrfalt, B.S.; Edward J. Keuer, B.S.; Yu-Ying Ku, B.S.; Wayne A. Landerholm, B.A.; Jaclin S. Lewbin, B.A.; Lenore P. Lewis, B.S.; Barbara Madenberg, B.S.; Rosemary A. Marone, B.S.; Gerald K. Masover, B.S.; Naboth C. Mbawa, B.A.; Michael A. Millay, B.A.; Leilani H. Miller, B.A.; Marianne A. Niedzlek, B.S.; Randy L. Packnik, B.S.; Patricia G. Palmquist, B.A.; Martin S. Robin, B.S.; Robert B. Rosen, B.S.; Gar W. Rothwell, M.S.; Henry D. Saberman, D.D.S.; Richard N. Sherwin, M.S.; Sidney T. Shinedling, B.S.; Marilyn C. Shultz, B.S.; Gregory L. Simone, B.S.; Caryl A. Sloane, B.A.; Edward M. Smith, B.S.; Susan J. Stamler, B.S.; June Steinberg, B.S.; Lawrence Sykora, B.S.; Ronald K. Warfield, B.S.; Franklin S. Weingarten, B.S.; Marian L. Wilson, M.S.; Tina H. Yacker, B.S.

*Major*—for the degree of Bachelor of Science, 30 hours (exclusive of all 100-level courses), distributed as follows:

Biological Sciences 240, 261, 300, 315, 324 or 380, 345

One from 230, 232, 280, 313, 319, 333, 384, 388, 389

In addition, enough courses at the 200 level or above, chosen with the consent of an adviser, to bring the total to 42 hours in biological sciences.

Mathematics 100, 101, and 130 or 104, 105, and 130.

(Mathematics 104, 105, and 130 are recommended for Biological Sciences 240 and required for Biological Sciences 343, 344.)

### *Required Prerequisite and Collateral Courses*

Chemistry 111 (if needed), 112, 113, 114, 233, 234

Physics 101, 102, 103; or 111, 112, 113

*Departmental Distinction:* A candidate must perform creditably in Biological Sciences 299, Individual Topics, and must pass a comprehensive examination administered by the department.

*Minor*—Students from other departments who wish to minor in biological sciences must take Biological Sciences 100, 101, 102, and 20 hours of courses in biological sciences at the 200 level or above, chosen in consultation with an adviser in the Department of Biological Sciences.

*Teacher Education in Biological Sciences: Requirements for Teaching in Secondary Schools*

*Major*—48 to 50 hours, distributed as follows:

Biological Sciences 100, 101, 102

210 or 211, 240, 261,

300, 307, 315, 324 or 380, 345

One course from 230, 232, 280,

313, 319, 333, 384, 388, 389

Three quarters of physics

Three quarters of chemistry (including organic)

Three quarters of mathematics

(calculus and/or statistics highly recommended)

Electives: 6 to 8 hours in biological sciences

(to provide a balance between plant and animal biology)

*Minor*—33 hours distributed as follows:

Biological Sciences 100, 101, 102

21 hours from 200 and 300-level biological sciences courses

## Chemistry

### Professors

William F. Sager, Ph.D., Head of the Department; Bernard J. Babler, Ph.D., Executive Secretary; Joseph H. Boyer, Ph.D.; Ferris B. Crum, Ph.D. (Emeritus); Roy Huitema, Ph.D. (Emeritus); Charles K. Hunt, Ph.D.; Chui F. Liu, Ph.D.; Clifford N. Matthews, Ph.D.; Robert M. Moriarty, Ph.D.; Jan Rocck, Ph.D.; Robert I. Walter, Ph.D.

### Associate Professors

Thomas H. Brown, Ph.D.; Richard L. Carlin, Ph.D.; Jacques Kagan, Ph.D.; Victor J. Mansfield, Ph.D.; Hans T. Mueller, Ph.D. (Emeritus); Samuel Schrage, Ph.D.

### Assistant Professors

Benedict W. Bangerter, Ph.D.; Ronald J. Baumgarten, Ph.D.; Richard P. Burns, Ph.D.; John W. Cowin, M.S.; Eric A. Gislason, Ph.D.; David George Gorenstein, Ph.D.; Anatol Gottlieb, T.Sc.D.; Cynthia J. Jameson, Ph.D.; Richard J. Kassner, Ph.D.; Rosalind A. Klaas, Ph.D.; Florence C. Klee, Ph.D.; Leonard Kotin, Ph.D.; Yechezkel Rasiel, Ph.D.; Edward G. Rietz, Ph.D.; George I. Sackheim, M.S.; John Steiner, Ph.D.; Milton Yusem, Ph.D.; Robert F. Zahrobsky, Ph.D.

### Instructors

Doris C. Blumenthal, M.S.; Shafeek Farag, M.A.; Wade A. Freeman, Ph.D.; Thomas A. Lothian, M.A.; James K. Luurs, M.S.; Ralph E. Meints, Ph.D.; Clarence J. Perry, M.Ed.; Eva Rocck, Ph.D.; Edward S. Sachs, M.S.; Michael G. Savoy, M.S.; Frances K. Seabright, M.S.; John E. Spikner, M.S.; Myo K. Yoo, M.S.



**Assistants**

Dalmacio A. Agdeppa, Jr., B.S.; Mir Amir Ali, M.S.; David E. Aylward, M.S.; Dorothy C. Barron, B.S.; Howard L. Blaz, B.S.; Listan L. Chang, M.S.; Yue-Guey L. Chang, M.S.; Craig M. Connally, B.S.; Phillip J. DeChristopher, M.S.; Johannes DeJong, Doct.; Wesley L. Doak, B.A.; Joseph C. Drozd, B.S.; Gary R. Dyrkacz, B.S.; Arthur F. Eidson, B.S.; Peter S. Ellis, B.S.; Bruce E. Firth, B.S.; Peter Pi-Cheng Fu, M.S.; Lilliana Gachich, M.S.; Ahmed M. A. Hamdoun, B.S.; David A. Harrison, M.A.; George J. Jilek, III, B.A.; Moo Jin Jun, M.S.; Krishan Lal Kalra, M.S.; Kumud D. Kanitakar, M.S.; Zivile Keliuotis, B.A.; Khe Bing J. Kho, M.S.; Ei-Lan Sharlin Liaw, B.S.; Donald B. Losee, Jr., M.S.; Alberto M. Martinez, M.S.; Stanley Merchant, M.S.; William F. Myszkowski, B.S.; Chui-Sheung Ng, M.S.; L. Jewell Nicholls, M.S.; Dennis H. Patterson, B.S.; Raymond T. Pavis, B.A.; James T. Przybytek, M.S.; Robert W. Schwartz, B.S.; Mary Ellen Sheridan, B.S.; Kyng-Eun Shin, B.S.; Arthur E. Siegel, B.S.; Anthony J. Spak, Jr., B.S.; Emilio Sturino, B.S.; Luisito A. Tolentino, B.S.; Neil M. Tomiuk, B.S.; Richard S. Tracey, B.S.; Lily C. Yang, B.S.; Chin-Lung Yeh, B.S.; Perciles Zacharopoulos, B.S.

**Post-Doctoral Fellows and Research Associates**

Nasir Ahmad, Ph.D.; Virander K. Bhatia, Ph.D.; Henry F. Dabek, Ph.D.; Phillippe G. DeSaulles, Ph.D.; David J. W. Goon, Ph.D.; Paul J. Green, Ph.D.; Nobuyuki Ishibe, Ph.D.; James N. McElearney, Ph.D.; Karl Meyer, Ph.D.; Gerard J. Mikol, Ph.D.; Robert D. Minard, Ph.D.; Rabindranath Mukherjee, Ph.D.; Hiroaki Nishikawa, Ph.D.; Robert N. Schwartz, Ph.D.; Radhakrishnan Selvarajan, Ph.D.; Paul Serridge, Ph.D.; George E. Shankle, Ph.D.; Shiv P. Singh, Ph.D.; V. Srinivasan, Ph.D.; Fred Stoos, Ph.D.

**Lecturers**

Ralph M. Deal, Ph.D.

*Major*—for the degree of Bachelor of Arts, 52 hours, distributed as follows:

Chemistry 111 (if needed), 112, 113, 114, 121<sup>1</sup>

233, 234, 235, 237, 282

340,<sup>2</sup> 341, 342, 343, 344, 345

*Required Prerequisite and Collateral Courses*

Mathematics 104 and 105 (if needed); 130, 131, 132

Physics 111, 112, 113

Chemistry majors are assigned a departmental adviser.

<sup>1</sup>Chemistry 117, 118, 119 may be substituted for 112, 113, 114, and 121.

<sup>2</sup>Chemistry 340 through 345 may be replaced by 380, 382, 383 and 8 additional hours of 300-level courses if the department recommends.

See also *The Chemistry Curriculum*.

*Departmental Distinction:* Candidates for departmental distinction must perform creditably in all required advanced hours. For specific requirements consult the executive secretary of the department at least two quarters before graduation.

*Minor*—Students from other departments who wish to minor in chemistry must take 32 hours of courses, chosen with the consent of an adviser in the Department of Chemistry. The following are recommended:

12-16 hours in 111, 112, 113, 114

16-20 additional hours, 12 of which must be at the 200 or 300 level

### *Teacher Education in Chemistry: Requirements for Teaching in Secondary Schools<sup>1,2</sup>*

<sup>1,2</sup>See notes 1 and 2 under *Major*.

*Major*—48 hours, distributed as follows: *Minor*—30-36 hours

Chemistry 112, 113, 114, 121

Chemistry 112, 113, 114, 121

233, 234, 235, 285

233, 234, 235

340, 341, 342, 343, 344, 345

Chemistry electives: 0-6 hours

*Supporting Courses*—42 hours

Mathematics 130, 131, 132, 133; 104 and 105 if needed

Physics 111, 112, 113

Science *electives* must be chosen in consultation with the adviser.

### **The Chemistry Curriculum**

The degree of Bachelor of Science in Chemistry is awarded students who successfully complete 192 hours, exclusive of physical education and basic military science, in this curriculum in the College of Liberal Arts and Sciences. This course of study satisfies all the requirements set by the American Chemical Society for professional accreditation.

Prerequisites for Chemistry 340 must be fulfilled before the fall quarter of the student's junior year.

Rhetoric 101, 102	8 Hours
German or Russian <sup>1</sup>	0-24
Humanities	12
Social Science	12
Mathematics 130, 131, 132, 133	20
Physics 111, 112, 113	14
Chemistry 117, <sup>2</sup> 118, 119	15
233, 234, 235, 237	15
340, 344, 347	13
341, 343, 345	6
315, 321, 322	11
Other approved 300-level courses	3
Advanced natural science and/or mathematics electives approved by the adviser	20
Electives	17-41

<sup>1</sup>The equivalent of two years in a single language at the college level; French may be accepted; consult the Department of Chemistry.

<sup>2</sup>Chemistry 117, 118, 119 may be replaced by 112, 113, 114, and 121 if the Department of Chemistry so recommends.

## Classics

### Professors

Edwin B. Levine, Ph.D., Head of the Department; Alfred P. Dorjahn, Ph.D. (Visiting)

### Assistant Professors

Elizabeth Gebhard, Ph.D.

### Instructors

Robert J. Callahan, M.A.; Denise Duffy, M.A.

### Assistants

Hoda Brigman, M.A.; Dianne M. Engram, M.A.

### Lecturers

Dwora Gilula, M.A. (Visiting)

*Major*—for the degree of Bachelor of Arts, 42 hours exclusive of 100-level courses, including the following:

#### *Specialization in Greek*

Greek 201, 202, 203, 211 and 24 additional hours in Greek, chosen with the consent of the department. Greek majors who elect a minor are urged to choose Latin. These courses are recommended: Latin 101, 102, 103, 104, 105, 106.

#### *Specialization in Latin*

Latin 201, 202, 203, 204, 205, 206, 207, 211, 250, 252. Latin majors who elect a minor are urged to choose Greek. These courses are recommended: Greek 101, 102, 103, 104, 105, 106.

Majors in classics are urged to take at least one year of ancient history, with concentration on the Greek and Roman periods.

*Minor*—Students from other departments who wish to minor in Greek or Latin must take a total of 32 hours in either, with a minimum of 8 hours in courses at the 200 level or above. Greek or Latin courses taken in fulfillment of a general education requirement may not be used for the minor.

## Economics

The degree program in economics is administered by the College of Liberal Arts and Sciences. Those listed below are members of the faculty of the College of Business Administration.

**Professors**

Raymond L. Richman, Ph.D., Coordinator of Economics; Robert W. French, Ph.D.; William D. Grampp, Ph.D.; Sherman Shapiro, Ph.D.

**Associate Professors**

Bert E. Elwert, D.B.A.; Richard Kosobud, Ph.D.; Oscar Miller, M.A.

**Assistant Professors**

Robert Auerbach, Ph.D.; Philip Cotterill, Ph.D.; Thomas Johnson, Ph.D.; Mildred Levy, Ph.D.; Ronald Moses, Ph.D.; Shlomo Shalit, M.B.A.; Allen Sinai, Ph.D.; Houston Stokes, Ph.D.; David Tuerck, Ph.D.

*Major*—for the degree of Bachelor of Arts, in Liberal Arts and Sciences, 40 hours, including:

Economics 120, 121, 320, 321

Finance 340

At least 20 additional hours at the 300 level with no more than 8 from any one of these three areas:

Area 1—Economics 324, 325, 326

Area 2—Economics 333, 334, 335

Area 3—Economics 327, 328, 329, 330, 331, 332

*Required Prerequisite and Collateral Courses*—20 hours, including:

Mathematics 110, 111, 112

Quantitative Methods 170, 171, 172

*Minor*—Students from other departments who wish to minor in economics must take at least 20 hours of course work including Economics 120, Economics 121, and one or more of the following: Economics 320, Economics 321, Finance 340.

**English**

John C. Johnson, Ph.D., Acting Head of the Department.

**Professors**

Josephine Bennett, Ph.D. (Visiting); Paul Carroll, M.A. (Visiting); John Conley, Ph.D.; Dean B. Doner, Ph.D.; Falk S. Johnson, Ph.D.; Alexander Karanikas, Ph.D.; Bernard R. Kogan, Ph.D.; Jay A. Levine, Ph.D.; Louis Marder, Ph.D.; Ralph J. Mills, Jr., Ph.D.; John F. Nims, Ph.D.; Robert B. Ogle, Ph.D.; Harry J. Runyan, Ph.D.; Andrew Schiller, Ph.D.; John B. Shipley, Ph.D.; James B. Stronks, Ph.D.; Paul Tabori, Ph.D. (Visiting); Lorenzo D. Turner, Ph.D. (Visiting); Eugene B. Vest, Ph.D.; Samuel A. Weiss, Ph.D.; Martin Wine, Ph.D.; Elizabeth V. Wright, Ph.D.

**Associate Professors**

Irving D. Blum, Ph.D.; Guinevere L. Greist, Ph.D.; Beverly Fields, Ph.D.; John C. Johnson, Ph.D.; Moreen C. Jordan, Ph.D.; Zelma B. Leonhard, Ph.D. (Emerita); John H. Mackin, Ph.D.; Adam Makkai, Ph.D.; Sonia Miller, Ph.D.; "A. Lavonne Ruoff, Ph.D.; Jaroslav Schejbal, Ph.D. (Visiting); Mary Thale, Ph.D.; Maurita Willett, Ph.D.

**Assistant Professors**

Norman R. Atwood, Ph.D.; Kenneth E. Bidle, Ph.D.; Donald E. Billiar, Ph.D.; Preston M. Browning, Ph.D.; Melvin H. Buxbaum, Ph.D.; Archibald J. Byrne, Ph.D.; Nancy R. Cirillo, Ph.D.; Sarah B. Cohen, Ph.D.; John P. Fludas, Ph.D.; Judith K. Gardiner, Ph.D.; Robert W. Gladish, Ph.D., Assistant to the Head; Edith Gold, Ph.D.; Hymen H. Hart, Ph.D.; Dale S. Herron, Ph.D.; Willis C. Jackman, M.A.; Howard H. Kerr, Ph.D.; Laurette A. Kirstein, M.A.; Robert J. Kispert, Ph.D.; David S. Lenfest, Ph.D.; Vincent Louthan, Ph.D.; W. Nell Love, Ph.D.; Valerie Makkai, Ph.D.; Ronald McCaig, M.A.; Patricia McFate, Ph.D.; Irving Miller, Ph.D.; Michael Morrisroe, Jr., Ph.D.; Margaret Oleksy, M.A.; Ted-Larry Pebworth, Ph.D.; Sondra Rosenberg, Ph.D.; James Russell, Ph.D.; Florence Sandler, Ph.D.; Catherine Shaw, Ph.D.; Gerald C. Sorensen, Ph.D.; Morris Star, Ph.D.; Robert L. Vales, Ph.D.; Dale E. Woolley, Ph.D.

**Instructors**

Michael Anania, M.A.; Annie Aubrey, M.A.; Desmond L. A. Avery, B.A.; Michael C. Bartlett, M.A.; John B. Bell, M.A.; Kathryn H. Carlson, M.A.; Rolf Charleston, M.A.; F. Gaylord Cox, M.A.; Russell E. Davis, M.A.; Bertram Enos, M.A.; Mary D. Ellickson, M.A.; Harry S. Epstein, M.A.; Roslyn Friedman, M.A.; Beverly M. Friend, M.A.; Mary Virginia Gibson, M.A.; Allen D. Goldhamer, M.A.; Elaine Grauer, M.A.; Pearl Greenstein, M.A.; Arthur L. Greenwald, M.A.; Robert C. Gruen, M.A.; Mimi S. Hall, M.A.; Eleanor K. Harris, M.A.; Lucy Hegie, M.A. (Emerita); Dolores Keranen, M.A.; Marion S. Kerwick, M.A. (Emerita); Gary R. Kirby, M.A.; Narvell Lane, M.A.; Joan C. Lawson, M.A.; James Lucas, M.A.; Thomas Mandel, M.A.; Horace C. Merten, M.A. (Emeritus); James W. Muir, Jr., B.A.; Sara C. Niederman, M.A. (Emerita); Jane Novak, M.A.; Nancy Parra, M.A.; Anne Phillips, M.A.; Gene W. Ruoff, M.S.; Constantine Santas, M.A.; Joseph W. Schellhardt, M.A.; Mary C. Sidney, M.A.; Stuart J. Silverman, M.A.; Diane E. Smith, M.A.; Frederick C. Stern, M.A.; Beatrice S. Timmis, M.A. (Emerita); Thomas Weisshaus, M.A.; Judith Weintraub, M.A.; Doris Welch, M.A.; Dorothy E. Welker, Ph.D.; Eugene Wildman, M.A.

**Assistants**

Vincent J. Balleras, Jr., M.A.; Linda M. Bates, B.A.; Lawrence J. Bommer, B.A.; Janet L. Borland, M.A.; Janet Borneman, M.A.; Barbara J. Boyer, B.A.; Anne S. Buchanan, B.A.; Joan H. Chesterton, B.A.; Linda W. Corman, M.A.; Gerald H. Claridge, B.A.; Cynthia Edelman, M.A.; Donald Garfield, M.A.; Susan Grathwohl, B.A.; James S. Hulin, B.A.; Stephen A. Huth, B.A.; John C. Jacobs, M.A.; John R. Jiambalvo, B.A.; Anne H. Joel, B.A.; Michael D. Johnson, M.A.; Ruta M. Juska, B.A.; Marilyn K. Laufe, M.A.; Elizabeth R. LeBlanc, B.A.; Millicent E. McFarland, B.A.; Patricia Meckstroth, M.A.; James R. Novotny, M.A.; Daniel J. Ozog, B.A.; Patricia M. Patsis, M.A.; John M. Perlette, M.A.; Sandra R. Rogosin, B.A.; Judith Rosenberg, M.A.; Carol L. Ross, M.A.; Joanne Seiser, M.A.; Elizabeth Thieme, M.A.; Richard Thieme, M.A.; Karen H. Vierneisel, B.A.; Sharon Washtien, B.A.; Susan Weisser, M.A.; Leela A. Wood, B.A.; Jane Zakrzewski, B.A.



Ozog, B.A.; Patricia M. Patsis, M.A.; John M. Perlette, M.A.; Sandra R. Rogosin, B.A.; Judith Rosenberg, M.A.; Carol L. Ross, M.A.; Joanne Seiser, M.A.; Elizabeth Thieme, M.A.; Richard Thieme, M.A.; Karen H. Vierneisel, B.A.; Sharon Washtien, B.A.; Susan Weissner, M.A.; Leela A. Wood, B.A.; Jane Zakrzewski, B.A.

### Lecturers

Margaret M. Angoli, M.A.; Edward Aronson, M.A.T.; Douglas Casement, B.A.; Charles Franklin, B.A.; Lloyd H. Geil, M.A.; John R. Holt, M.A.; Don L. Lee, A.A.; John Roberts, M.A.; Melaine Wozniak, B.A.

*Major*—36 hours, exclusive of 100-level courses, including the following:

#### *Specialization in American literature*

English 231 or 232; 255, 256, 257, 234, 301

4 hours from 310, 350, 355, 386, 389

4 hours from 288, 316, 375, 376, 377, 380, 385, 388, 392, 393, 394

plus 4 hours from any other 200-level or 300-level courses in American or English literature

#### *Specialization in English literature*

English 231 or 232, 301, 334, 335

4 hours from *each* of the following:

American literature

English literature prior to 1660

English literature from 1660 to 1800

English literature from 1800 to 1900

English literature of the twentieth century

plus 4 hours from any other 200-level or 300-level courses in American or English literature.

*Note:* 100-level courses in English do not count toward the major. English 150, 151, 152, taken in sequence, are prerequisites for all 200 and 300-level courses in English for the major.

*Departmental Distinction:* Grades of A or B in English 298, three senior honors seminars. Senior honors seminars are open to students of superior ability and achievement. Admission is by application to and with the approval of the department.

Superior freshmen and sophomores may participate in the freshman and sophomore honors programs by invitation.

*Minor*—Students from other departments who wish to minor in English must take at least 20 hours in English courses. A minimum of 12 must be at the 200 or 300 level, including courses in Shakespeare, literary criticism, English language, and American literature. Courses taken in fulfillment of a general education requirement may not be used.

*Teacher Education in English: Requirements for Teaching in Secondary Schools*

Major—52 hours

Rhetoric 133

English 231, 150, 151, 152

210, 255, 256, 257, 295

301, 234, any 200- or

300-level course in

English. (English 111

is recommended for

prospective teachers in

the Chicago school system.)

Minor—32 hours

Rhetoric 133

English 150, 151, 152,

255, 256, 257,

295

**French****Professors**

William M. Schuyler, Ph.D., Head of the Department; Robert E. Hallowell, Ph.D.; Marie E. Lein, Ph.D.; Charles M. Lombard, Ph.D.

**Associate Professors**

Franklin P. Sweetser, Ph.D.; Marie-Odile Sweetser, Ph.D.; Dorothy R. Thelander, Ph.D.

**Assistant Professors**

Edmund J. Bender, Ph.D.; Priscilla P. Clark, Ph.D.; Edna S. Epstein, Ph.D.; Byron R. Libhart, Ph.D.; Barbara G. Mittman, Ph.D.; Kenneth I. Perry, Ph.D.; Clara S. Skogen, M.A.; Yvonne B. Weinstein, *Diplôme d'Etudes Supérieures*.

**Instructors**

Raymond M. Archer, M.A.; Dorothy G. Barber, M.A.; Paul M. De Strooper, M.A.; Janet Eisenberg, M.A.; Joy N. Humes, M.A.; Douglas E. Johnson, M.A.; Carrie D. Moore, M.A.; Sylvia Patlogan, M.A.; Jacqueline R. Stern, M.A.; Marcelle Sylvan, M.A.; Nancy Tomasek, M.A.

*Major*—for the degree of Bachelor of Arts, a minimum of 54 hours (excluding French 101, 102, 103, 104, 105, 106, 113, and 216) including the following:

French 201, 202, 203, 209, 210, 211, and 24 hours of 300-level courses in French, including 313 or 314.

In addition, 12 hours of French electives must be chosen with the consent of an adviser.

It is recommended that French majors take one year of English literature and one year of European history.

A comprehensive examination is required of all majors in their last quarter of residence. Students enrolled for practice teaching during their last quarter may take the examination at an earlier date.

*Related Fields*—French majors may also choose one of three related fields as follows:

<i>French Studies—</i>		<i>Comparative Literature—</i>	
48 hours, including		48 hours, including	
Art history	3 hours	Classics	8 hours
History of music	3	English literature	8
Classics and/or		German literature	4
humanities	6	Spanish literature	3
History	12	Humanities	8
Philosophy and/or		Electives	17
political science	4		
English	8		
Electives	12		

*Foreign Language Studies*—48 hours, with a minimum of 36 hours in a second foreign language, and twelve hours of foreign language electives.

Courses in any of the three related fields must be chosen with the consent of an adviser.

*Departmental Distinction:* Recommendation is based on a 4.500 average in all courses counted for the major and a grade of A on the departmental comprehensive examination.

*Minor*—Students from other departments who wish to minor in French must take from 24 to 32 hours in French, including a maximum of 12 in French 104, 105, 106 (if needed), and 18-24 hours in courses at the 200 level or above, chosen with the approval of the Department of French.

*Teacher Education in French: Requirements for Teaching in Secondary Schools*

<i>Major—39 hours</i>		<i>Minor—30 hours</i>	
French 201, 202, 203		French 104, 105, 106	
209, 210, 211		201, 202, 203	
282		209, 210, 211	
18 hours of 300-level courses		282 is recommended	
including 313 or 314			

**Geography**

Clifford E. Tiedemann, Ph.D., Acting Head of the Department

**Professors**

Alden D. Cutshall, Ph.D.

**Associate Professors**

Mary M. Colby, Ph.D. (Emerita); Edwin H. Draine, Ph.D.; Mildred I. Finney, Ph.D.; David M. Solzman, Ph.D.; Clifford E. Tiedemann, Ph.D.

**Assistant Professors**

James E. Landing, Ph.D.; Albert J. Larson, Ph.D.; O. Simon Ojo, Ph.D.

**Instructors**

Richard Askeland, M.A.; Rachel Fitch, M.S.; Bruce Gladfelter, M.A.; Kenneth Kartz, M.A.; Burton Kessler, M.A.; Charles Schmidt, M.A.; Danuta Schneider, M.A.; Timothy Sullivan, M.A.T.; Walter Wacht, M.A.

**Lecturers**

Minna Greene, M.A.

**Assistants**

Adam Pertkiewicz, M.A.

*Major*—for the degree of Bachelor of Arts, 45 hours, at least 20 of which must be in upper-level courses, distributed as follows:

3 courses in physical geography (may be met by a physical science sequence in geology together with Geography 102 and 103)

2 courses in regional geography, including Geography 221

2 upper-level systematic courses, exclusive of those in physical geography Geography 351 or 355 or 357, and 13 additional hours in geography.

Geography majors are assigned a departmental adviser.

*Departmental Distinction*: Consult the departmental adviser. Enrollment in Geography 391 and eligibility for graduation with college honors.

*Minor*—Students from other departments who wish to minor in geography must take at least one course in physical geography, one in systematic geography, one advanced course in regional geography, and electives to bring the total to 20 hours. Courses must be chosen with the consent of an adviser in the Department of Geography.

*Teacher Education in Geography: Requirements for Teaching in Secondary Schools*

*Major*—48 hours

Geography 101, 102, 103

104, 109, 114, 221, and

19 additional hours of

200-level courses, in-

cluding at least one

additional regional

course

Electives: 10-34 hours

*Minor*—35 hours

Geography 101, 102, 103

104, 109, 221 and 10

additional hours of

200-level courses including

one additional regional

course

## Geological Sciences

### Professors

Werner H. Bauer, *Dr.rer.nat.*, Head of the Department; Robert W. Karpinski, *D.es.Sc.*, Emeritus

### Associate Professors

Robert E. DeMar, Ph.D.; Helen M. McCammon, Ph.D.; Richard B. McCammon, Ph.D.; Istravos S. Papadopoulos, Ph.D.; Walter Sadlick, Ph.D.

### Assistant Professors

John Bolt, Ph.D.; Warren C. Forbes, Ph.D.; Aijaz A. Khan, Ph.D.; A. F. Koster Van Groos, Ph.D.; Kelvin S. Rodolfo, Ph.D.; Norman D. Smith, Ph.D.; Ekkehart Tillmanns, *Dr.rer.nat.*

### Assistants

Barbara Buss, B.S.; Tumkur Gopinath, B.S.; David Long, B.S.; John McArdle, B.S.; Patricia Speier, B.S.; Vaidyanatha Subramanian, B.S.

*Major*—for the degree of Bachelor of Science, 54 to 57 hours, distributed as follows:

Geological Sciences 101, 102, 103 and 30 hours of advanced courses in geological sciences chosen with the approval of the department. Included should be a field course (which cannot count more than 4 hours toward the major) and Chemistry 112, 113, 114, which are prerequisites for several geological sciences courses.

*Required Prerequisite and Collateral Courses*—34 to 43 hours, including

Mathematics<sup>1</sup> 130, 131, 132, 133

Physics<sup>2</sup> 101, 102, 103

<sup>1</sup>Students without appropriate entrance credit must also take Mathematics 104 and 105 and Chemistry 111.

<sup>2</sup>Students interested in geophysics, geochemistry and some other areas should substitute Physics 111, 112, 113.

*Departmental Distinction:* To be recommended for graduation with departmental distinction in any of the programs of the Department of Geological Sciences a student must have a grade-point average of 4.00 or better (exclusive of military science and physical education) and must perform creditably in Geological Sciences 299.

*Minor*—Students from other departments who wish to minor in geological sciences must take 27 hours, chosen with the approval of the department. A



maximum of 15 hours may be at the 100 level. Geological Sciences 110 is usually required.

*Teacher Education in the Earth Sciences: Requirements for Teaching in Secondary Schools*

*Major*—46 to 52 hours, distributed as follows:

Geological Sciences 101, 102, 103

20 hours of advanced courses chosen  
with the advice of the department.

6-12 hours of an approved summer field  
course.

Geography 102, 103

*Supporting Courses*—37 to 41 quarter hours, distributed as follows:

Mathematics 130, 131

Physics—3 quarters

Chemistry 112, 113, 114 or equivalent

Major requirements are somewhat flexible. In certain cases substitutions of courses in physics, chemistry, biology, mathematics, or geography may be made with approval of the departmental adviser. Geology 110 may be substituted for the summer field course with the consent of the departmental adviser provided 4 additional hours of advanced geology are taken. Students interested in this major should see an adviser from the Geological Sciences Department in the first quarter of the freshman year.

## German

### Professors

Robert R. Heitner, Ph.D., Head of the Department; Lee B. Jennings, Ph.D.; Robert Kauf, Ph.D.; Daniel C. McCluney, Jr., Ph.D.; Leroy R. Shaw, Ph.D.; Elizabeth Teichmann, Ph.D.; Hazel C. Vardaman, Ph.D.

### Associate Professors

Arnold J. Hartoch, Ph.D.; Ernest S. Willner, Ph.D.

### Assistant Professors

Daniel G. Harrington, M.A.; Else Huenert-Hofmann, Ph.D.; Karl F. Otto, Jr., Ph.D.; Marilyn Torbruegge, Ph.D.

### Instructors

David E. Anderson, M.A.; Frederick Betz, M.A.; Johanna Braunfeld, M.A.

(Emerita); Dean W. Faulwell, M.A.; Gertrude E. Grisham, M.A.; George Huenert, M.A.; Thomas M. Pool, M.A.; Edward J. Stone, M.A.; David M. Weible, M.A.

*Major*—for the degree of Bachelor of Arts, 43 hours in 200-level courses (exclusive of courses given in translation and German 240), including:

German 201, 202, 203, 204, 221, 230, 290,  
292, 294

8 additional hours of 300-level courses

*Note:* German 101, 102, 103, 104, 105, 106, 108, 109, 113, 114, 115, 121, 122, 123, 134, 135, 136 are excluded from the major.

*Required Collateral Courses*—24 hours, to be chosen in consultation with the departmental adviser.

*Honors*—Students who wish to be recommended for honors must also complete German 298.

*Minor*—Students from other departments who wish to minor in German must take a minimum of 19 hours at the 200 level or above, selected with the approval of the Department of German.

#### *Teacher Education in German: Requirements for Teaching in Secondary Schools*

*Major*—46 hours

German 201, 202, 203, 204, 206,  
220, 221, 230, 240, 290,  
292, 294

4 additional hours selected from  
207 or any 300-level course

*Minor*—30 hours

German 104, 105, 106,  
201, 202, 203

6 additional hours  
selected from 204, 220  
221, 230

## History

### Professors

Robert V. Remini, Ph.D., Chairman of the Department; Shirley A. Bill, Ph.D.; Bentley B. Gilbert, Ph.D.; Louis Gottschalk, Ph.D. (Visiting); Peter d'A. Jones, Ph.D.; Stanley L. Jones, Ph.D.; Stanley Mellon, Ph.D.; Robert L. Nicholson, Ph.D.; Gilbert Osofsky, Ph.D.; Max Savelle, Ph.D. (Visiting); Edward C. Thaden, Ph.D.;

Lorenzo D. Turner, Ph.D. (Visiting); John B. Wolf, Ph.D.

### Associate Professors

Stanley Buder, Ph.D. (Visiting); Peter J. Coleman, Ph.D.; Carolyn A. Edie, Ph.D.; Margaret Y. George, Ph.D.; Robert L. Hess, Ph.D.; Melvin G. Holli, Ph.D.; Kenneth

A. Lockridge, Ph.D.; Richard Millman, Ph.D.; Louis Unfer, Ph.D. (Emeritus).

### Assistant Professors

Burton J. Bledstein, Ph.D.; William Cohen, Ph.D. (Visiting); Robert E. Conrad, Ph.D.; James E. Cracraft, Ph.D.; Gerald A. Danzer, Ph.D.; William A. Hoisington, Ph.D.; George Huppert, Ph.D.; David Jordan, Ph.D.; Ronald P. Legon, Ph.D.; David Lightner, Ph.D.; Peter R. McKeon, Ph.D.; Charles R. McKirdy, Ph.D.; Marion S. Miller, Ph.D. (Visiting); David S. Patterson, Ph.D.; James H. Robbins, Ph.D.; Karl A. Schleunes, Ph.D.

### Instructors

Thomas A. Askew, Jr., Ph.D.; Ira Berlin, M.A.; Joan M. Coppleson, M.A.; Arthur L. Donovan, M.A.; Philip H. Dreyer, M.A.; Frederica C. Harris, M.A.; Donald J. Klimovich, M.A.; William A. Peters, M.A.; Andrew K. Prinz, Ph.D.; John M. Shay, M.A.

### Assistants

James R. Baylor, M.A.; Brandon H. Beck, M.A.; Evan D. Brandstadter, B.A.; Thomas R. Bullard, M.A.; Barbara Clinchy, B.A.; Robert D. Cudaback, M.A.; James C. Dean, M.A.; Mary M. Devlin, B.A.; Barbara L. Farr, M.A.; Mary E. Finn, M.A.; Frank J. Hajek, Ph.C.; Pericles B. George, B.A.; Blanche G. Hersh, M.A.; Arthur E. Hirsh, B.A.; Richard C. Holbrook, M.A.; Norman M. Klein, M.A.; Philip H. Kozlowski, M.A.; Robert M. Macala, M.A.; Eileen R. Mackevich, M.A.; Christine McHugh, M.A.; David J. Miller, B.A.; Frank W. Mimms, M.A.; Richard L. Pullin, B.A.; Rona Rosenblatt, B.A.; Richard F. Rouse, B.A.; Alberto Sbacchi, M.A.; Barry L. Smith, B.A.; Muriel B. Stone, B.A.; Takeko K. Stover, M.A.; Zdenko Zlatar, M.A.

*Major*—for the degree of Bachelor of Arts, 45 hours, distributed as follows:

100-level courses	9 hours (maximum)
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200 and 300-level courses:

United States history	12
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European history since 1450	12
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A third field of history	12
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All majors are assigned a departmental adviser.

*Departmental Distinction:* A 4.50 all-University average and a 4.75 in all courses taken in the Department of History at Chicago Circle.

*Minor*—Students from other departments who wish to minor in history must take at least 30 hours of United States and European history, with at least 14 hours in courses at the 200 or 300 level.

*Teacher Education in History: Requirements for Teaching in Secondary Schools*

*Major*—48 hours

History 111, 112, 113, or equivalents,

151, 152, 153 or equivalents

United States history	9-12 hours, 200-300 level
European history since 1450	9-12 hours, 200-300 level
Courses in fields other than United States and modern European history	9-12 hours, 200-300 level

The Department of History does not require its teacher education majors to offer a minor field.

## Mathematics

### Professors

Joseph Landin, Ph.D., Head of the Department; Herbert J. Curtis, Ph.D., Executive Secretary; Harold W. Bailey, Ph.D.; Norman Blackburn, Ph.D.; Flora Dinkines, Ph.D.; Philip Dwinger, Ph.D.; Irwin K. Feinstein, Ph.D.; Paul Fong, Ph.D.; Evelyn Frank, Ph.D.; Henry L. Garabedian, Ph.D.; Victor K.A.M. Gugenheim, Ph.D.; Norman T. Hamilton, Ph.D.; Miles C. Hartley, Ph.D. (Emeritus); Noboru Ito, Ph.D.; Jindrich Necas, Ph.D. (Visiting); David A. Page, M.A.; Louis L. Pennisi, Ph.D.; Reuben Sandler, Ph.D.; W. Forrest Stinespring, Ph.D.; Victor Twersky, Ph.D.

### Associate Professors

Furio Alberti, Ph.D.; Warren H. Brothers, Ph.D.; Djairo De Figueiredo, Ph.D.; David A. Foulser, Ph.D.; Alice G. Hart, M.S.; Louise Hay, Ph.D.; Christoph Hering, Ph.D.; William A. Howard, Ph.D.; Shmuel Kantorovitz, Ph.D.; James W. Moeller, Ph.D.; Kenneth H. Murphy, M.S.; Pramod K. Pathak, Ph.D.; Neil W. Rickert, Ph.D.; Alexander P. Stone, Ph.D.; Avrum I. Weinzwieg, Ph.D.

### Assistant Professors

Raymond Balbes, Ph.D. (Visiting); Ruth M. Ballard, Ph.D.; Neil Berger, Ph.D.; Bernard M. Berlowitz, Ph.D.; Leslie Cohn, Ph.D.; Michael J. Collins, Ph.D.; Raymond T. Czerwinski, Ph.D.; James A. Donaldson, Ph.D.; Verena Dyson, Ph.D.; Helmut P. Epp, Ph.D.; Samuel Feder, Ph.D.; Gerald Gordon, Ph.D.; Louis I. Gordon, Ph.D.; Matthew I. Gould, Ph.D. (Visiting); Robert N. Grannick, Ph.D.; Brayton I. Gray, Ph.D.; Floyd B. Hanson, Ph.D.; Morton E. Harris, Ph.D.; Melvin L. Heard, Ph.D.; Roger G. Hill, B.A.; William M. Kantor, Ph.D.; James J. Kelleher, Ph.D.; Carol M. Knighten, Ph.D.; Robert L. Knighten, Ph.D.; Richard Larson, Ph.D.; Sim Lasher, Ph.D.; Jeff E. Lewis, Ph.D.; Mu-Chou Liu, Ph.D.; Alan McConnell, Ph.D.; Hans J. Munkholm, M.S.; Grace M. Nolan, M.S.; Thomas B. Ondrak, M.S.; Arthur Pu, Ph.D.; Lena Pu, Ph.D.; J. E. S. Raghavan, Ph.D.; Yao-Chun Rickert, Ph.D.; Yoram Sagher, Ph.D.; Nicholas C. Scholomiti, M.A.; Helen W. Sears, M.A.; David M. Segal, Ph.D.; Gary M. Seitz, Ph.D.; Laurence R. Sjoblom, B.S.; Robert I. Soare, Ph.D.; Rose L. Vedral, M.A.; Glenn P. Weller, Ph.D.; Alexander Zabrodsky, Ph.D.; Leo F. Ziomek, Ph.D.

**Instructors**

Winifred Berglund, M.A.; Kathleen M. Hotton, M.A.; Betty J. Kuzmanic, M.Ed.; Julia B. Linn, M.S.; Jeanette S. Lumley, M.A.; Charles E. Olson, B.S. (Emeritus); Rose L. Shook, M.A. (Emerita); Rosemary Wiley, M.A.

**Assistants**

Peggy F. Abbruscato, B.S.; Kenneth F. Arnold, M.S.; Peter J. Atkinson, B.S.; Ib Axelsen, M.S.; Thelma Balbes, B.A.; Ronald Beckman, M.S.; Joel Bernstein, B.S.; Patricia J. Blus, B.S.; Mary M. Bork, B.S.; Arthur C. Brumfield, B.S.; Alan J. Burger, M.A.; Therese B. Butzen, B.S.; Hubert H. Chin, M.A.; William B. Duffie, M.A.T.; Tobias Enright, B.S.; David C. Feinstein, M.S.; Diane S. Gabrisko, B.S.; Ann Harnsberger, M.S.; Jorja R. Henikoff, B.S.; Erwin S. Janush, M.S.; Richard A. Jenson, B.A.; Shyam Johari, M.S.; Calvin C. Kafka, B.S.; Bing-Ying Lang, B.S.; Eng Bin Lim, B.S.; Bertrand I. Lin, M.S.; Manuel G. Liristis, B.S.; David L. Liu, M.S.; Li-Fan Ma, M.S.; Janice M. Mamon, B.A.; Gary L. Marotta, B.A.; Geoffrey Mason, B.S.; Patrick P. McBride, B.S.; Janet B. Mellinger, M.S.; Marjorie W. McNichols, M.A.; Rebecca H. Montgomery, B.A.; Seong-Ki Moon, M.S.; Ellen S. Munkholm, M.S.; Richard E. Nicholson, B.S.; Manuel J. Parra, M.S.; Louise A. Parson, B.A.; Bhupendra R. Patel, M.A.; Kai-Jaung Pei, B.S.; Marius Prapuolenis, B.S.; Lance R. Robinson, M.A.; Lawrence N. Staff, M.A.; Alex Thannikkary, M.S.; Frederick A. Thulin, B.S.; Jia-Yeong Tsay, M.A.; Gail E. Tverberg, M.S.; Raija Virtanen, M.S.; Rhonda J. Weisberg, B.S.; Michael Yanoff, B.S.; Carol E. Yount, B.A.

*Major*—for the degree of Bachelor of Science, 56 hours, which must include:

Mathematics 130, 131, 132, 133	20 hours
310, 311, 312, 340, 341, 342	19

The remaining hours are to be chosen from mathematics courses numbered 195 or higher with the exception of 300, 301, 302 and 348. A student must have an average of at least 3.25 in all mathematics courses beyond 133 in which he has received credit. Each mathematics major is assigned a departmental adviser and the student's choice of courses must be approved by the adviser.

*Transfer Students.* A transfer student must have credit in at least 18 hours of 300-level mathematics courses taken on this campus.

*Required Prerequisite and Collateral Courses*—A student majoring in mathematics must have 24 hours of credit in a program of collateral courses approved by a departmental adviser and chosen from one or two of the following fields: biological sciences, chemistry, economics, French, geology, German, philosophy, physics, or Russian. Enrollment in courses in other fields may be requested by petition to the head of the department.

A student who intends to major in mathematics but lacks the prerequisites to begin with Mathematics 130 may obtain credit for college algebra and trigonometry by taking Mathematics 104 and 105 or 100 and 101. However, none of these courses may be applied toward the 56 hours of credit specified above.



*Honors Courses.* Honors sections of courses required of majors in mathematics (130, 131, 132, 133, 310, 311, 312, 340, 341, 342) as well as honors courses in special topics (399) are offered throughout the year. For details see the Timetables. Admission to honors sections is not restricted to mathematics majors, but consent of the department is required.

*Departmental Distinction:* The student must qualify for college honors and must have done exceptional work in mathematics, as determined by the department. Generally a 4.50 average on all upper division work is required.

*Minor*—Students from other departments who wish to minor in mathematics must complete Mathematics 130, 131, 132, 133, and 12 hours of mathematics courses at the 200 or 300 level.

*Teacher Education in Mathematics: Requirements for Teaching in Secondary Schools*

*Major*—55-57 hours

Mathematics 130, 131, 132, 133,  
300, 301, 302, 303, 304  
305, 307, 310, 340, 341  
342 or 348

Electives: 5-19 hours

*Minor*—34-36 hours

Mathematics 130, 131, 132, 133  
300, 307  
310 and 302 or  
340 and 303 or  
348 and 303

Students in the Teacher Education in Mathematics curriculum must have a cumulative grade-point average in mathematics courses of not less than 3.50 to be recommended for Education 270, *Student Teaching*. Students are strongly urged to choose electives from areas of study which will support their major programs. The departmental advisers for this curriculum are available to assist the student in the selection of such courses.

## Music

Milan Kaderavek, M.Mus., Acting Head of the Department

### Professors

Agnes C. Schuldt, M.Mus. (Visiting)

### Assistant Professors

Euana Gangware, M.Mus.; William M. Kaplan, D.Mus.; Richard E. Norton, Ph.D.; Nicholas J. Valenziano, M.Mus.

### Instructors

Milan Kaderavek, M.Mus.; Maxine E. Mandell, M.Mus.

### Assistants

Richard Billingham, M.Mus.

Students must pass a placement examination to qualify as music majors or to elect a minor field of specialization in the Department of Music. Those who fail this examination may petition the department for individual consultation. Credit earned in Music 100 may not be applied toward the major or the minor field of specialization.

*Major*—for the degree of Bachelor of Arts, 60 hours, including:

Music 101, 102, 103, 104, 105, 106, 170, 171,  
201, 202, 203, 204, 205, 206, 230, 231,  
232, 300, 301, 302 and three hours to be selected  
from the following<sup>1</sup>: 151, 152, 153, 154, 155, 156, 158.

<sup>1</sup>No more than ½ hour credit earned in any quarter may be applied toward the three-hour requirement in these courses.

*Departmental Distinction*: A candidate must be eligible for college honors and must have an average of 4.5 in all courses taken in the Department of Music.

*Minor*—Students from other departments who wish to minor in music must take 32 hours, including:

Music 101, 102, 103, 104, 105, 106,  
170, 230, 231, 232, and two hours from  
Music 151, 152, 153, 154, 156, 158, 171

## Philosophy

### Professors

George T. Dickie, Ph.D.; Arnold Levinson, Ph.D.; Daniel J. Morris, Ph.D.; William Tait, Ph.D.; Irving Thalberg, Ph.D.; Donald A. Wells, Ph.D., Chairman; Paul Ziff, Ph.D.

### Associate Professors

Terence Parsons, Ph.D.; Brian Skyrms, Ph.D.

### Assistant Professors

Sandra Bartky, Ph.D.; David Blumenfeld, Ph.D.; Marcia Eaton, Ph.D.; Richard Kraut, Ph.D.; Rita Nolan, Ph.D. (Visiting); Kathryn Parsons, Ph.D.

### Instructors

Neal K. Grossman, M.A.; Ralf Meerbote, M.A.; Robert Page, M.A.; Paul Teller, B.A.; Arthur Weintraub, B.A.

*Major*—for the degree of Bachelor of Arts, 42 hours, including:

Philosophy 201, 203, 211, 330, 332

22 additional hours in philosophy

Philosophy 299, Seminar, is recommended

Majors are assigned a departmental adviser.

*Departmental Distinction:* Awarded by the department on the basis of course work plus an original paper. Consult with the department about eligibility and procedures to be followed.

*Minor*—Students from other departments who wish to minor in philosophy must take 20 hours in philosophy, 12 of which must be at the 200 or 300 level.

## Physics

### Professors

Swaminatha Sundaram, D. Sc., Head of the Department; Seymour Bernstein, Ph.D.; Arnold R. Bodmer, Ph.D.; James S. Kouvel, Ph.D.; Edward B. McNeil, Ph.D.; Rupert M. Price, M.A. (Emeritus); Ora L. Railsback, Ph.D. (Emeritus); R. Curtis Retherford, Ph.D.; Herman B. Weissmann, Ph.D.; Lester Winsberg, Ph.D.

### Associate Professors

Stanley Aks, Ph.D.; William R. Anderson, M.S.; Alan S. Edelstein, Ph.D.; James W. Garland, Ph.D.; Gloria T. Hoff, Ph.D.; Herman J. Johnson, M.S.; Seymour Margulies, Ph.D.; William J. Otting, Ph.D.; John N. Pappademos, Ph.D.; David S. Schreiber, Ph.D.; Ram R. Sharma, Ph.D.; Harold M. Skadeland, M.A.

### Assistant Professors

Larry L. Abels, Ph.D.; Richard A. Carhart, Ph.D.; Martin H. Garrell, Ph.D. (Visiting); Howard S. Goldberg, Ph.D.; Jared W. Haslett, M.S.; Jerome E. Jackson, Ph.D. (Visiting); Jack A. Kaeck, Ph.D.; Stephan J. Krieger, Ph.D.; Franca Kuchnir, Ph.D. (Visiting); Isidor Lerner, M.A. (Emeritus); Fischel E. Morraine, *Dipl. Ing.* (Emeritus); James G. Ring, Ph.D. (Visiting); Donald M. Rote, Ph.D.; Julius Solomon, Ph.D.; Ben Varga, Ph.D.; David J. Vezzetti, Ph.D.

### Lecturers

Robert Dennen, Ph.D. (Visiting)

### Assistants

James H. Abbott, B.S.; Robert G. Aitken, B.S.; Barry Berk, B.S.; Lawrence R. Cecchini, B.S.; Howard A. Cozzi, B.S.; Leonard M. DeBall, M.S.; Joseph F. DeMelo, M.Sc.; Naim Elyashar, M.S.; Antonios Gonis, B.S.; Theodore T. Harduvel, B.S.;

Curt Hofer, M.S.; Siraj M. Khan, M.S.; Lawrence M. Klonowski, M.S.; Jerome E. Majewski, B.S.; William C. Muellner, M.S.; Jack Richter, B.S.; Henry A. Schmelz, B.S.; Lambert H. Schoonveld, M.S.; Joanne L. Selden, M.S.; Annapoorni Shadagopan, M.Sc.; Vengipura Shadagopan, M.S.; Ashok K. Sharma, M.Sc.; Vasundara Venkatraman, M.Sc.; Randall J. Wade, M.S.; Earl R. Wendorf, B.S.; Russell Whitman, M.S.; William P. Wood, B.S.

#### Research Assistant

Chin-Sheng Chien, M.S.

*Major*—for the degree of Bachelor of Arts, 56 hours, including the following:

Physics 111, 112, 113, 114

221, 222

301, 302

321, 322

341, 361

plus two 300-level physics courses to be chosen in consultation with the adviser.

#### *Required Prerequisite and Collateral Courses—*

Mathematics 104 and 105 (if needed, 130, 131,

132, 133, 220, 310, 311

Chemistry 112, 113, 114

*Note:* Students may substitute, on the advice of the department, Chemistry 117, 118, 119 for Chemistry 112, 113, 114, if total hours required in their program do not exceed 108.

*Departmental Distinction:* Candidates must register for Physics 291, 292, or 293 to be considered. Awards of Distinction, High Distinction, and Highest Distinction will be based on the overall quality of the student's course work and the recommendation of the instructor in the above courses.

*Minor*—Students from other departments who wish to minor in physics must take Physics 111, 112, 113, 114, 221, 222, 301, and one course from the following: Physics 321, 371, 331, 341, 302.

#### *Teacher Education in Physics: Requirements for Teaching in Secondary Schools*

*Major*—56 hours

Physics 111, 112, 113, 114

221, 222

301, 302

321, 322

341, 361

*Supporting Courses*—42 hours

Mathematics 130, 131, 132, 133

220, 310, 311

Chemistry 112, 113, 114

Two physics laboratory courses, chosen in consultation with the adviser

*Minor*—(Second field of specialization) —31 hours

Physics 111, 112, 113, 114

321

Physics electives (8 hours)

### The Physics Curriculum

The degree of Bachelor of Sciences in Physics is awarded students who successfully complete this curriculum in the College of Liberal Arts and Sciences.

180 hours, exclusive of physical education and basic military science, distributed as follows:

Rhetoric 101, 102	8 Hours
Chemistry 117, 118, 119	15
Foreign language (the equivalent of two years in a single language, at the college level)	0-24
Social Science	12
Humanities	12
Mathematics 130, 131, 132, 133	20
220, 310, 311	10
Physics 111, 112, 113, 114	19
221, 222	5
301, 302, 303, 304	16
321, 322, 341, 342	16
361, 371, 381, 382	16
Electives	12-36

### Political Science

#### Professors

Richard M. Johnson, Ph.D., Head of the Department; Hollis W. Barber, Ph.D.; Twiley W. Barker, Jr., Ph.D.; Boyd R. Keenan, Ph.D.; Milton Rakove, Ph.D.

#### Associate Professors

Leonard E. Goodall, Ph.D.; Doris A. Graber, Ph.D.; Lyman A. Kellstedt, Ph.D.; Byung C. Koh, Ph.D.; Frank Tachau, Ph.D.

#### Assistant Professors

George D. Beam, Ph.D.; Catherine M. Kelleher, Ph.D.; Peter R. Knauss, Ph.D.; Michael A. Murray, Ph.D.; Dick W. Simpson, Ph.D.



**Instructors**

George I. Balch, M.A.; Edwin J. Bell, M.A.; Roosevelt Ferguson, M.S.P.A.; Malcolm G. Hicks, B.A.; Charles F. Levine, M.A.; Philip B. Lyons, M.A.; Kaye M. Miller, M.A.

**Assistants**

Kenneth H. Barry, B.A.; Harold M. Barger, M.A.; Barry D. Bender, B.A.; Joseph M. Conte, B.A.; Mary D. English, B.A.; Teresa A. Foley, B.A.; Mary Jo Good, M.A.; Victoria A. Greenberg, B.A.; Sherry M. Joseph, M.A.; Alison Lauriat, B.A.; Delwin R. Peterson, B.A.; Alfred G. Ronan, B.A.; Valerie J. Schwartz, B.A.; John C. Thomas, M.A.; Sharon K. Zingery, B.A.

*Major*—for the degree of Bachelor of Arts, 36 hours, distributed as follows:

Political Science 150, 151

4 hours in each of three of the following:

Government and administration (in addition to Political Science 150, 151)

Political theory

Public law

International affairs

16 additional hours in political science

A major may include 5 hours from related departments, chosen with the advance approval of the department.

*Departmental Distinction:* To be considered for departmental distinction the student must have an all-University grade-point average of 4.25, an average of 4.50 in all his political science courses, must present an acceptable essay written while he is enrolled in Political Science 299 (both course and credits must be beyond those required for the major), and pass a comprehensive examination in political science. A student working in this program must expect to enroll in Political Science 299 for at least 4 hours credit during his tenth and/or eleventh quarters; thus, if he expects to graduate in June, he should enroll during the fall and/or winter quarters of his senior year. Further details may be obtained in the Department of Political Science Office.

*Minor*—Students from other departments who wish to minor in political science must take Political Science 150, 151 and 16 additional hours of political science courses, 12 of which must be at the 200 or 300 level, chosen in consultation with an adviser in the Department of Political Science.

*Teacher Education in Political Science: Requirements for Teaching in Secondary Schools*

*Major*—48 hours

Political Science 150, 151

4 hours in *each* of the following:

Government and administration

Political theory

*Minor*—30 hours

Political Science 150, 151

4 hours in *each* of two fields of the major

Not more than 12 hours of

Public law	100-level courses
International affairs	14 hours of political
Not more than 12 hours of 100-level political science courses	science electives
Electives: 2-22 hours	

*Notes:* The major may include 12 hours from a related department.

The Department of Political Science requires an approved teaching minor in its teacher education program because political science courses are not taught extensively in the secondary schools. The completion of an approved minor qualifies the student to teach in another area.

For those who plan to teach in the Chicago schools, the department recommends a teaching minor in history.

## Psychology

### Professors

Harry S. Upshaw, Ph.D., Head of the Department; Philip Ash, Ph.D.; Rosalind D. Cartwright, Ph.D.; John D. Davies, Ph.D.; Leonard D. Eron, Ph.D.; I. E. Farber, Ph.D.; Paul C. Greene, Ph.D.; Harold Klehr, Ph.D.; Eli A. Lipman, Ph.D.; Susan M. Markle, Ph.D.; Sheldon Rosenberg, Ph.D.

### Associate Professors

Gershon Berkson, Ph.D.; Louis A. Berman, Ph.D.; Roger L. Dominowski, Ph.D.; Derek P. Hendry, Ph.D.; Allen H. Howard, Ph.D.; Vivian D. Lipman, Ph.D.; Nan E. McGehee, Ph.D.; Robert S. Wyer, Ph.D.; Lucy C. Zaccaria, Ph.D.

### Assistant Professors

Alan Benton, Ph.D.; Philip E. Freedman, Ph.D.; Barry S. Greenwald, Ph.D.; C. Lawrence Gruder, Ph.D.; Mary F. Luetgert, Ph.D.; Leon Miller, Ph.D.; Rolf A. Peterson, Ph.D.; Alexander J. Rosen, Ph.D.; Allan L. Seltzer, Ph.D.; Herbert H. Stenson, Ph.D.

### Instructors

James W. Creaser, Ph.D.; Ernest W. Kent, Ph.D.

### Assistants

Marian G. Anagnoslopoulos, B.A.; Nancy E. Avis, B.A.; Roberta A. Barker, B.A.; Thomas E. Barrett, B.A.; Richard A. Bednar, B.A.; John J. Brescia, B.A.; Helen S. Brown, B.A.; Joseph A. Buga, B.A.; Boyd S. Callahan, B.A.; Adalton C. Caram, B.A.; Nancy R. Chiswick, B.A.; Ronald E. Cichon, B.A.; Mark E. Cohen, B.A.; James B. Cox, B.A.; Mary P. Eitzen, B.A.; Lee Goldberg, B.A.; Mary A. Gruber, B.A.; Sherry Hawk, B.A.; John W. Hennessy, B.A.; Joseph A. Heyl, M.A.; Randy L. Hoheizel, B.A.; Pamela A. Holy, B.A.; Robert C. Horwitz, B.A.; Mary K. Jacobs, B.A.; Douglas M. Johnson, B.A.; Augustine Juodvalkis, B.A.; Jane Kaplan,

B.A.; Deborah Kelfer, B.A.; Susan Kornblum, B.A.; Karen M. Laskowski, B.A.; Patricia A. McMahan, B.A.; Margaret A. Melstrom, B.A.; Darlene Mooney, B.A.; James T. Napolitan, B.A.; Carol P. Peterson, B.A.; Sandra F. Phillips, B.A.; Hubert H. Rehm, B.A.; Daniel Romer, B.A.; John J. Ryan, B.A.; Terry R. Sanders, B.A.; Diane E. Skinner, B.A.; Linda Smith, B.A.; Joseph P. Stokes, B.A.; Stanley F. Watson, B.A.; Michael S. Zolno, B.A.

### Lecturers

Samuel S. Hung, Ph.D.; Judith Torney, Ph.D.; Theta H. Wolf, Ph.D.

*General Major*—for the degree of Bachelor of Arts (primarily for students in general liberal education), 36 hours, including:

Psychology 100 or 102 and 240 or 241 or 243

At least 20 hours in psychology courses numbered above 200

Eight hours in another social science

*Behavioral Science Major*—for the degree of Bachelor of Science (for students preparing for graduate work in psychology), 36 hours, including:

Psychology 100 or 102; 241, 243, and 291

At least three from Psychology 250, 251, 252, 256, 318

Three quarters of mathematics including either Mathematics 101 or 104, 110 and 194 or Mathematics 101

(or 104 and 105) and 130, 131, and 132

Philosophy 222

*Departmental Distinction:* A candidate must be eligible for College Honors, must satisfactorily complete the required program for behavioral science majors, and must complete a satisfactory thesis in Psychology 299.

*Minor*—Students from other departments who wish to minor in psychology must take a minimum of 20 hours, 12 of which must be at the 200 or 300 level.

## Slavic Languages and Literatures

### Associate Professors

Nicholas Moraveevich, Ph.D., Head of the Department; Elizabeth Pribic, Ph.D.

### Assistant Professors

Wilma Hoffman, M.A.

### Instructors

George J. Gutsche, M.A.; Jean L. Hellie, M.A.; Jon L. Lutz, M.A.; Wanda L. Sorgente, M.A.; Jana I. Tuzar, M.A.

For the degree of Bachelor of Arts students may choose one of the following:

*Major Only*—48 hours beyond Russian 106, including Russian 201, 202, 203, 221, 222, 223, 224; 12 additional hours at the 200 level and 8 at the 300 level.

*Major and Related Field*—48 hours, as above, and

1. 24 hours of introductory courses and 8 hours at the 200 and 300 levels in any of the following fields: French, German, Greek, Italian, Latin, Portuguese, and Spanish or
2. 12 hours in 100-level courses and 16 hours in 200 and 300-level courses in any of the following fields: English, philosophy, speech.

*Major with Prerequisite and Collateral Courses*—48 hours, as above, and 36 additional hours distributed as follows:

Prerequisites: History 111, 112, 113

Collateral Courses: History 223, 224, 225, 310, 396

Political Science 335.

*Minor*—Students from other departments who wish to minor in Slavic languages may do so in two ways:

1. Those who do not satisfy the College language requirement in Slavic languages take a total of 32 hours, including Russian 101 through 106, and 8 hours on the 200 and 300 levels, chosen with the approval of the Department of Slavic Languages and Literatures.
2. Those who have competence at the level of Russian 104 or beyond take 20 hours on the 200 and 300 levels, chosen with the approval of the Department of Slavic Languages and Literatures.

## Sociology

### Professors

Robert L. Hall, Ph.D., Head of the Department; Robert E. Corley, Ph.D., Associate Head of the Department; Peter P. Klassen, Ph.D.; Roger W. Little, Ph.D.; Mildred A. Schwartz, Ph.D.; Ethel Shanas, Ph.D.

### Associate Professors

M. Rue Bucher, Ph.D.; James T. Carey, Ph.D.; William W. Erbe, Ph.D.; John W. C. Johnstone, Ph.D.; George J. McCall, Ph.D.

### Assistant Professors

Butler P. Crittenden, III, Ph.D.; Ozzie L. Edwards, Ph.D.; John W. Martin, Ph.D.; Gerald M. Swatez, Ph.D.; Ronald C. Vander Kooi, Ph.D.; Mary G. Wiley, Ph.D.

### Instructors

Janet M. Alger, M.A.; Steven F. Alger, M.A.; Kathleen Crittenden, M.A.; Richard J. McKinlay, M.A.; Helen R. Miller, M.A.; James L. Norr, M.A.; James L. Ross, M.A.; Larry L. Tift, M.A.; James J. Vanecko, M.A.; Philip R. Weinberger, M.A.; James A. Wiley, M.A.

*Major*—for the degree of Bachelor of Arts, 46 hours, including the following:

Sociology 100

Sociology 185 or Psychology 243

Sociology 262, 263

30 additional hours in sociology. At the student's option, up to 12 hours from the approved list of collateral courses in other departments may be substituted for an equal number of hours in sociology, provided the same courses are not counted toward the fulfillment of the general education requirements of the College.

Collateral courses may *not* be substituted for Sociology 100, 185, 262, or 263.

Approved collateral courses are:

Anthropology 213, 314, 317, 363

History 373, 374, 377, 378, 379

Mathematics 194 or 195

Philosophy 222, 345

Psychology 210, 215, 315, 317, 318

*Departmental Distinction:* A candidate must have a 4.00 all-University grade-point average, must meet all general requirements for a major in sociology, complete Sociology 287 and 288, Senior Seminar, and at least 4 hours in Sociology 299, Individual Study.

*Minor*—Students majoring in another department who wish to minor in sociology must complete 20 hours of sociology, of which at least 12 hours must be in courses at the 200 or 300 level.

### *Teacher Education in Sociology: Requirements for Teaching in Secondary Schools*

*Major*—48 hours, including the following:

Sociology 100, 130, 185, 343

24 additional hours in sociology,

of which at least 16 hours must

be at the 200 or 300 level.

Anthropology 150 or 130, and 160

*Minor*—32 hours, including the following:

Sociology 100, 130, 185

Anthropology 160 and 130

12 additional hours in

sociology at the 200 or 300 level.

The Department of Sociology strongly advises an approved teaching minor for majors in its teacher education program because sociology courses are not taught extensively in secondary schools. The completion of an approved minor qualifies the student to teach in another area.



## Spanish, Italian, and Portuguese

### Professors

Audrey L. Kouvel, Ph.D., Acting Head of the Department; Jose Sanchez, Ph.D.

### Associate Professors

Violet Berquist, M.A.; Eduardo Betoret-Paris, Ph.D.

### Assistant Professors

Diane Birkemoe, Ph.D.; Lucille V. Braun, Ph.D.; James D. Compton, Ph.D.; Ruth El Saffar, Ph.D.; Jerry R. Rank, Ph.D.

### Instructors

Constance Adelman, M.A.; Pedro J. Algarin, M.A.; Sharon Algarin, M.A.; Donald Bartell, M.A.; Manuel Blanco-Gonzales, M.A.; Jose Buergo, M.A.; Americo Bugliani, M.A.; Virginia Burd, M.A.; Judith G. Chandran, M.A.; Mark J. Cramer, M.A.; Lydia Z. Fernandez, M.A.; Walter J. Guevara, M.A.; Norma W. Guice, M.A.; Margherita M. Harwell, M.A.; Barbara Keeley, M.A.; Hernani Larisgoitia, M.A.; Maria Naon, M.A.; Dennis Nazak, M.A.; Roxalana Procyk, M.A.; Doris Rahe, M.A.; Susan Socolow, M.A.; Ramona G. Spinka, M.A.; Luciana A. Stefani, Ph.D.; Ferdina J. Tort, M.A.; Philip L. Vandrey, M.A.; Shirley Verdugo-Perez, M.A.

*Major*—for the degree of Bachelor of Arts, 42 hours, exclusive of courses given in translation, including:

Spanish 218, 219, 221, 222, 223, 224

At least 6 hours of Spanish composition and conversation courses on the 200 level, chosen in consultation with a departmental adviser

At least 18 hours of 300-level courses in Spanish.

*Required Collateral Courses*—24 hours, to be chosen in consultation with a departmental adviser.

*Departmental Distinction*: The student must complete at least 18 hours in upper-division courses with an average of 4.50 to be considered for departmental distinction.

*Minor*—Students from other departments who wish to minor in Spanish must take a minimum of 19 hours at the 200 level or above, exclusive of courses in translation. At least 6 hours must be in the 211-216 sequence, and at least 6 additional hours must be in either 221 and 222 or 223 and 224. Courses must be chosen in consultation with the Department of Spanish.

*Teacher Education in Spanish: Requirements for Teaching in Secondary Schools**Major*—49 hours

Spanish 211, 212, 213, 214, 215  
 216, 218, 221, 222, 280  
 281, 331, or 332, 350, 351  
 352, 353

At least 5 hours in literature  
 courses above the 200 level.

*Minor*—30 hours

Spanish 104, 105, 106  
 211, 212, 213  
 214, 215, 216

**Speech and Theatre****Professors**

R. Victor Harnack, Ph.D., Head of the Department; Lawrence T. Frymire, Ph.D.; John Haney, Ph.D.; Chester C. Long, Ph.D.; Helen Hayes MacArthur, B.A.; Carl A. Pitt, Ph.D.; Harry J. Skornia, Ph.D.

**Associate Professors**

Grace Holt, M.A.

**Assistant Professors**

Conde R. Hoskins, M.A.; Helen J. Hovde, M.A.; Raoul F. Johnson, Ph.D.; Theodore V. Kundrat, M.A.; Katharine T. Loesch, Ph.D.; Natalie Schmitt, Ph.D.; Barbara S. Wood, Ph.D.

**Instructors**

Ann Armstrong, M.A.; Carol A. Berthold, M.A.; Janice M. Crews, M.A. (Emerita); Julia M. Curry, M.S.; Frances M. Goulson, M.T.A. (Emerita); John A. Jones, M.A.; Donald Pukala, M.A.; William F. Raffeld, M.A.; Frances Thornton, M.A.

**Assistants**

Judith Albert, B.A.; Ronald Brandt, B.A.; Virginia Garcia, B.A.; Zivile Numgaudas, B.A.; George Serlovsky, B.A.; William Snyder, B.A.

*Major*—for the degree of Bachelor of Arts, 44 hours exclusive of Speech 100, 101, and 141. At least 24 hours must be at the 200 or 300 level, and all major programs must include Speech 201 or 202. Majors must demonstrate proficiency in public speaking and oral reading at the Speech 101, 141 levels.

Majors elect one of three programs: *Communications and Public Address*, *Theater and Oral Interpretation*, or *Mass Media*. Consult the department office for examples of programs in these areas. Choices will be made in consultation with a departmental adviser.

*Departmental Distinction:* A candidate must have a cumulative grade-point average of 4.00 and a grade of B in Speech 298; with High Distinction, either a cumulative grade-point average of 4.00 and a grade of A in Speech 298 or a cumulative grade-point average of 4.25 and a grade of B in Speech 298, with Highest Distinction, a cumulative grade-point average of 4.25 and a grade of A in Speech 298.

*Minor*—Students from other departments who wish to minor in speech and theater take at least 28 hours, chosen in consultation with an adviser in the Department of Speech and Theater. At least 12 of the 28 must be at the 200 or 300 level.

*Teacher Education in Speech: Requirements for Teaching in Secondary Schools Communication and Public Address:*

*Major*—48 hours

Speech 101 or 102, 141, or  
proficiency<sup>1</sup>

111, 112, 113

121, 122, 123, 201 or 202

211, 212, 213

*Minor*—30 hours

Speech 101, 141, or proficiency<sup>1</sup>

111, 112, 113, 201 or 202

211 or 212 or 213

*Theater and Oral Interpretation:*

*Major*—48 hours

101 or 102, 141, or proficiency<sup>1</sup>

111, and 112 or 113

121, 122, 123, 151

201 or 202, 211 or 212 or 213

241, 261, 264

Electives: 0-22 hours

*Minor*—30 hours

101, 141 or proficiency<sup>1</sup>

121, 122, 123, 151

201 or 202, 241, 264

<sup>1</sup>If the student demonstrates proficiency in Speech 101 and 141 (by departmental examination), additional hours must be taken to achieve the 48-hour requirement for the major and the 30-hour minimum requirement for the minor.

## The Preprofessional Programs

The College offers work, in varying degrees, that prepares the student to enter the professional fields.

**Occupational Therapy**—Minimum grade-point average, 3.500.

The first year is taken in the General Curriculum of the College of Liberal Arts and Sciences. Before a student is admitted to the curriculum, he must be personally interviewed by the Director of the occupational therapy curriculum

at the School of Associated Medical Sciences, University of Illinois at the Medical Center, or by a designated representative.

<i>First Year</i>	<i>Hours</i>
Art 204	4
Humanities (approved sequence)	12
Physical Science 101, 102	8
Recommended electives	13-15
Physical education	3

The second and third years are taken on the Urbana campus; the fourth and fifth (16 calendar months), at the Medical Center. The degree is awarded by the College of Medicine.

*Complete Preprofessional Programs* are offered in prelaw, medical record administration, medical record technology, dentistry, medicine, nursing, pharmacy, and veterinary medicine.

Meetings are arranged to permit students in the preprofessional programs to discuss academic problems with representatives from the professional colleges.

The minimum admission requirements for each of the professional programs follow. Attainment of the minimum grade point averages listed below does not in itself assure admission.

**Prelaw**—A baccalaureate earned in a department of the College of Liberal Arts and Sciences and a 3.500 average qualify a student for application to the University of Illinois College of Law.

**Medical Dietetics**—a 3.00 minimum grade-point average, 90 quarter hours, exclusive of physical education and basic military science, distributed as follows:

	<i>Hours</i>
Rhetoric 101, 102	8
Chemistry 112, 113, 114, 133, 134	20
Biology 100, 101, 102, 250	17
Mathematics 104, 105	8
Psychology 100	4
Sociology 100	4
Economics 120	4
Humanities	12
Electives	13

The third and fourth years are taken in the School of Associated Medical Sciences of the College of Medicine, which also awards the degree.

**Medical Record Administration**—Minimum grade-point average: 3.000.

135 hours, exclusive of physical education and basic military science, distributed as follows:

*Hours*

Rhetoric 101, 102	8
Foreign language (highly recommended)	24
Biological sciences	12
Physical science	12
Social science	12
Humanities	12
Biological Sciences 133, 134	10
Electives	45

The fourth year is taken in the College of Medicine, which also awards the degree.

**Medical Technology**—A 3.00 minimum grade-point average and 135 hours, exclusive of physical education and basic military science, distributed as follows:

*Hours*

Rhetoric 101, 102	8
Foreign language (highly recommended)	24
Social science	12
Humanities	12
Chemistry 112, 113, 114, 121, 233, 234	25
Physics 101, 102, 103	15
Biological Sciences 100, 101, 102, 250	17
Additional biological sciences electives	7
Mathematics courses to fulfill prerequisites for physics courses (may be met by placement or by course work)	
Electives to complete the required total of 135 credit hours.	

The fourth year is taken in the School of Associated Medical Sciences of the College of Medicine, which also awards the degree.

**Predentistry**—Minimum grade-point average: 3.250.

Students must take the Dental Aptitude Test. Application forms and details may be obtained from Room 318 University Hall.

90 quarter hours, exclusive of physical education and basic military science, distributed as follows:

*Hours*

Rhetoric 101, 102	8
Chemistry 112, 113, 114, 233, 234 or 117, 118, 119, 133, 134	22-23
Biological Sciences 100, 101, 102	12
Physics 101, 102	10
Electives (Physics recommended)	37-38

If a student wishes to receive a B.S. degree in Dentistry, he must have completed two years of a foreign language before entering dental school.

**Premedicine**—A student who is considering entering medical college should become familiar with the particular requirements of the schools to which he intends to apply.

Each year the Association of American Medical Colleges issues *Medical School*



*Admission Requirements*, a compilation of the admission requirements of accredited medical schools. A student in premedicine will find this an invaluable guide to admission requirements.

Admission to the premedical curriculum at Chicago Circle is in no sense a guarantee of subsequent acceptance by the College of Medicine of the University.

The Catalog of the University of Illinois College of Medicine states the following: "Students seeking admission to the College of Medicine must:

1. Demonstrate in addition to academic achievement, the emotional maturity, the integrity, and the motivation judged necessary for the successful study and practice of medicine.
2. Have received a baccalaureate degree (ordinarily B.A. or B.S.) from a recognized college or university or be eligible to receive such a degree upon satisfactory completion of the curriculum of the first year in the College of Medicine. Students from colleges that do not grant a degree after the satisfactory completion of the first year of medicine may be considered for admission after satisfactory completion of three years (not less than 90 semester hours) of college work if such students are eligible for full senior status (i.e., eligibility to receive a baccalaureate degree after completion of the senior year) in that College."

The undergraduate program must include as a minimum:

*Biology.* A full year's course in Biological Sciences (100, 101, 102, usually animal) with appropriate laboratory work. This course should emphasize the cellular and molecular aspects as well as the structure and function of living organisms.

*Chemistry.* Two years of college chemistry, divided about equally between organic and inorganic. Laboratory work and familiarity with quantitative techniques are important aspects of this experience.

*Physics.* One full year of college credit in physics (with laboratory experience).

The college major should be in the field that the student finds most interesting. If he chooses a division of science, he should obtain as broad an experience in the humanities as feasible; if he chooses the humanities, he should be certain to include the minimum science requirements but not necessarily limit himself to these minima. The College of Medicine would expect some studies, but not require specific sequences, in English and foreign languages. Mathematics through calculus is recommended. Psychology and sociology are examples of studies that are of value in the understanding of behavior and will complement studies both in the sciences and humanities.

*Medical College Admission Test.* All candidates are required to take the Medical College Admission Test recommended and approved by the Association of American Medical Colleges. The applicant must obtain a satisfactory score on the Medical College Admission Test.

*Bachelor's Degree.* The College of Liberal Arts and Sciences at Chicago Circle accepts a total of 32 hours of credit from the first year at the University's College of Medicine to enable the student to complete the requirements for a bachelor's degree as well as for a medical degree in seven rather than the usual eight years. This program requires that (1) the student be in good standing in the College of Medicine; (2) work taken at the College of Medicine does not duplicate work taken in premedical courses; (3) the student complete the third or last year of premedical study, consisting of at least 30 hours of credit, at Urbana or Chicago Circle; and (4) the student meet all requirements for graduation from the College of Liberal Arts and Sciences.

The following are the College of Medicine courses accepted by the College of Liberal Arts and Sciences and the majors to which they apply:

- 1. Biochemistry 301, 302, and 303, to be applied to a chemistry major or for elective credit at the upper-division level for a total of 9 quarter hours.
- 2. Physiology 301, 302, and 303, to be applied to a biology major or for elective credit at the upper-division level for a total of 15 quarter hours.
- 3. Histology, to be applied to a biology major or as elective credit at the upper-division level for a total of 12 quarter hours.
- 4. Gross anatomy, to be applied to a biological sciences major or for elective credit at the upper-division level for a total of 12 quarter hours.

**Prenursing**—Minimum grade-point average: 3.000.

45 hours, exclusive of physical education, distributed as follows:

	Hours
Rhetoric 101, 102	8
Biological Sciences 100, 101	8
Chemistry 112, 132	9
Sociology 100	4
Psychology 100	4
Humanities	8
Electives (Biological Sciences 102 recommended)	4

**Prepharmacy**—Minimum grade-point average: 3.000.

45 hours, exclusive of physical education, health science, and military science, distributed as follows:

	Hours
Rhetoric 101, 102	8
Chemistry 112, 113, 114 (or 117, 118, 119)	12-15
Mathematics 104, 105 (or 100, 101)	8-10
Electives (foreign language, humanities, social science)	12-17

**Preveterinary Medicine**—Minimum grade-point average: 3.500.

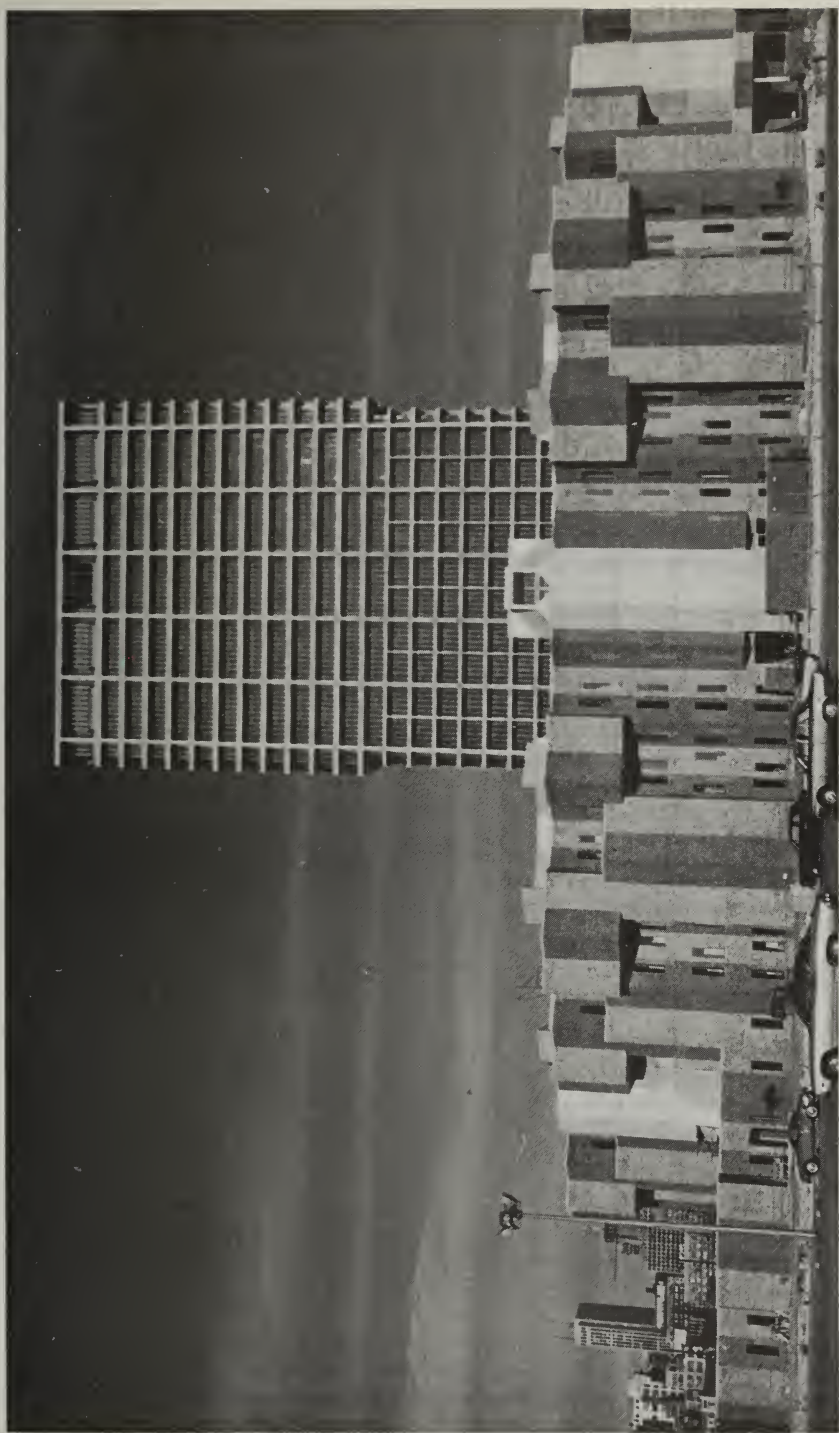
96 hours, exclusive of physical education and military science, distributed as follows:

	<i>Hours</i>
Rhetoric 101, 102	8
Biological Sciences 100, 101, 102	12
Physics 101, 102, 103	15
Chemistry 112, 113, 114, 121 (or 117, 118, 119) 133, 134	23-25
Foreign language (one)	12
Social sciences*	12
Humanities*	12

\*Courses to be selected in consultation with a college adviser.

The first year of the curricula in forestry and home economics and two years of prejournalism may also be taken within the General Curriculum.

*Note:* A student who is not accepted into the professional program of his choice and wishes to pursue another degree program in the College of Liberal Arts and Sciences is subject to all the degree requirements of the new program.



# The School of Physical Education

SHELDON L. FORDHAM, Ed.D., Director

CHARLES J. KRISTUFEK, M.S., Assistant Director

The School of Physical Education serves a dual function—it offers a wide variety of courses from which the student may fulfill his physical education requirement, and it offers a professional program in which students majoring in physical education may study for the degree of Bachelor of Science in Physical Education.

## **The Required Program for Students Enrolled at Chicago Circle**

Men and women entering the University with less than 90 quarter hours of credit are required to secure six quarters of credit in physical education, including any amount transferred, unless they are over thirty years of age. Credit and grades for these six quarters of required physical education are not included in the total hours or the scholastic average required for graduation.

The evaluated results of the preregistration medical examination are used to prescribe each student's program. Students with handicaps are assigned activities commensurate with their physical ability.

*Veterans* have fulfilled the physical education requirement and are exempt from physical education. However, they are encouraged to utilize the physical education facilities, as are all students in the University.

Although a swimming requirement is not currently in effect, nonswimmers are encouraged to register in the beginning course, PEM 107. Other swimmers may enroll in any of the other swimming courses for which they have the prerequisites. A swimming course may be selected at any time except the first quarter.

Students who are placed into PEM 101, Prescribed Exercise, by the Health Service should continue in the same program unless advised otherwise by the Health Service or the School of Physical Education.



### General Six-Quarter Plan

*The Men's Program* is organized on a conditioning-fitness, vigorous muscular activity, team and individual recreational sports progression: in the first quarter, students learn to understand and to engage in programs that aid in improving and appraising fitness; in the second and third quarters, they continue vigorous muscular activity in specific sports and in such activities as gymnastics, combatives, weight training and weight lifting; during the last three quarters, with emphasis on carry-over activities, they engage in individual and team recreational sports.

#### Quarter 1

All students should register in PEM 106 unless they are assigned to PEM 101 by the Health Service.

#### Quarters 2 and 3

During these two quarters, one course from each of categories A and B should be taken unless a swimming course is substituted.

##### A

PEM 121—Weight Training  
PEM 123—Weight Lifting

##### B

PEM 112—Tumbling  
PEM 113—Double Tumbling Stunts  
PEM 114—Apparatus Stunts  
PEM 117—Boxing  
PEM 118—Wrestling  
PEM 119—Foil Fencing  
PEM 120—Personal Defense  
PEM 122—Individual Athletics  
PEM 124—Track and Field Athletics

#### Quarters 4, 5, 6

During the last three quarters, any course may be selected provided at least one is from each category. If this requirement is met during quarters 4 and 5, the student may select any course, including those listed under Quarters 2 and 3, for the sixth quarter.

##### A

PEM 125—Flickerball  
PEM 126—Touch Football  
PEM 127—Softball  
PEM 128—Soccer  
PEM 131—Speedball

##### B

PEM 116—Sabre Fencing  
PEM 132—Archery  
PEM 134—Handball  
PEM 135—Tennis  
PEM 137—Bowling  
PEM 138—Golf  
PEM 139—Backyard Sports  
PEM 142—Ballroom Dance  
PEM 143—American Square Dance  
PEM 144—Folk Dance  
PEM 145—Modern Jazz

*The Women's Program* consists of a one-year required sequence and a one-year elective sequence. The one-year required sequence consists of PEW 100, Conditioning; an elected course from Area I; and an elected course from Area II.

PEW 100, Conditioning, is designed to give the student a better understanding of the structure of the body and its capacity for movement. It

includes the basic skills used in sports and rhythmic activity and some relaxation techniques. Area I courses in dance, gymnastics, and diving emphasize the aesthetic use of movement, movement control, coordination, and poise. Area II courses in swimming and field sports aid in the development of strength and endurance. A course may be selected from Area II before or after a course is taken in Area I.

#### *Area I*

PEW 105—Elementary Rhythms  
 PEW 106—Intermediate Rhythms  
 PEW 107—Apparatus  
 PEW 108—Free Exercise  
 PEW 115—Synchronized Swimming  
 PEW 116—Beginning Diving  
 PEW 118—Advanced Synchronized  
     Swimming  
 PEW 145—Modern Jazz I  
 PEW 146—Ballet I

#### *Area II*

PEW 110—Beginning Swimming  
 PEW 111—Advanced Beginning  
     Swimming  
 PEW 112—Intermediate Swimming  
 PEW 113—Advanced Swimming  
 PEW 122—Speedball  
 PEW 125—Softball  
 PEW 126—Field Hockey  
 PEW 127—Soccer  
 PEW 138—Track and Field

The student chooses courses for the second year of the physical education program. The department strongly urges that this time be devoted to gaining that measure of specialized skill which will encourage further college and adult participation. Excellence in performance is often a prerequisite to continuation in sports, dance, aquatics, and gymnastics after education in the classroom ceases.

### **Intercollegiate and Intramural Athletics**

A complete program of intercollegiate athletics, including cross country, soccer, football, ice hockey, basketball, swimming, gymnastics, wrestling, fencing, track and field, baseball, tennis, golf, and volleyball is maintained.

Over twenty activities comprise the Men's Intramural Program under the supervision of the Intramural Director.

### **Women's Athletic Association and Orchesis**

*The Women's Athletic Association* offers all women students the opportunity to participate in an extramural and intramural sports program. The main objective of W.A.A. extramurals is to give the highly skilled participant an opportunity to compete against other schools. In intramurals, the Chicago Circle student, regardless of skill, is able to participate with friends strictly for the fun of the sport. By paying student activities fees, included in tuition, all women are eligible for participation in one or many of the 16 sponsored sports.

*Orchesis* offers opportunities for men and women to participate in a variety of dance activities such as folk and square dance, modern jazz, ballet, and modern dance forms and to work creatively in group and individual choreography and production.

# The Professional Programs

## Physical Education for Men

LEO L. GEDVILAS, Head of the Department

CHARLES J. KRISTUFEK, Supervisor of the Professional Program

MATTHEW H. ELLSWORTH, Supervisor of the Service Program

### Professors

Peter R. Berrafato, M.S.; Sheldon L. Fordham, Ed.D.; John O. Jones, M.S. (Emeritus)

### Associate Professors

Leo L. Gedvilas, M.S.; Charles J. Kristufek, M.S.; Lester H. Miller, M.A.; Benedict W. Montcalm, M.A.; Walter G. Versen, M.Ed.

### Assistant Professors

Robert J. Beck, M.Ed.; James C. Descourouez, Ed.M.; Matthew H. Ellsworth, Ed.M.; Harold H. Nemoto, M.A.; William J. Penny, Ph.D.; Richard R. Rader, M.A.; William H. Roetzheim, M.S.; Bradley L. Rothermel, Ph.D.; Thomas F. Russo, Ed.M.

### Instructors

Robert W. Danner, M.A.; Frank Jambois, M.S.; Raymond T. Kasper, M.S.; William F. Leach, M.S.; Ralph W. Mackh, M.Ed.; Michael B. McGovern, M.S.; Steven B. Nasatir, M.A.; Leon F. Pickens, M.S.; Thomas P. Sattler, M.S.; John B. Shea, M.S.; James L. Tylk, M.S.; Paul T. Wright, Ed.M.

### Assistants

Jerome I. Cohen, B.S.; Samuel Donnelly, B.S.; Roger F. Dorio, B.S.; John A. Dunlop, B.S.; William F. Fudala, B.S.; Leonard J. Gramarossa, B.S.; James E. Izral, B.S.

Freshmen who wish to enter the professional curriculum must meet the entrance requirements of the School of Physical Education. Students who transfer from another institution or from another college of the University must meet the following grade-point requirements: students with less than 90 quarter hours credit—3.30 cumulative average or higher; students with 90 quarter hours credit or more—3.50 cumulative average or higher.

For the degree of Bachelor of Science in Physical Education for Men, a minimum of 203 hours is required, distributed as follows:

<i>General Education, 66 hours</i>		<i>Hours</i>
Biological Sciences 100, 101, 102—General Biology		12
Biological Sciences 133—Human Biology I		5
Biological Sciences 134—Human Biology II		5
Rhetoric 101, 102		8
Speech 100—Principles of Effective Speaking		3
Speech 101—Effective Speaking		2
Political Science 151—American Government: Organization and Powers		4
Humanities courses		12
History 153—History of the United States from 1890		4
Psychology 100—Introduction to Psychology		4
Sociology 100—Introduction to Sociology		4
Health Science 180—Personal and Community Health		3
<i>Education, 28 hours</i>		
Education 170—Educational Foundations		4
Education 210—The Educative Process		4
Education 230—Curriculum and Instruction in Secondary Schools		4
Education 250—Educational Evaluation		4
Education 270—Educational Practice with Seminar		12
<i>Courses in the Major, 73 hours</i>		
PEM 170—Baseball		4
PEM 171—Basketball		4
PEM 172—Football		4
PEM 173—Gymnastics		2
PEM 174—Swimming		4
PEM 175—Track and Field Athletics		4
PEM 176—Wrestling		4
PEM 177—Fundamentals of Special Activities (Field Sports and Bowling)		2
PEM 178—Fundamentals of Special Activities (Badminton, Volleyball, and Tennis)		2
PEM 179—Handball, Archery and Golf		2
PEM 180—Fitness Program		4
PEM 185—Introduction to Physical Education		3
PEM 188—History of Sports		4
PEM 250—Kinesiology		5
PEM 251—Physiology of Muscular Activity		4
PEM 252—Theory of Prescribed Exercise		4
PEM 253—Tests and Measurements in Physical Education		4
PEM 255—First Aid and Care and Prevention of Athletic Injuries		4
PEM 260—Organization of Physical Education Programs		3
PEM 261—Organization of Athletic Programs		3
PEM 262—Organization and Administration of Intramural Sports Programs		3

*Minors and Electives, 36 hours*

Additional courses are necessary to complete the required number of

hours for graduation from the curriculum. Recommended electives are selected with the help of the faculty adviser.

## Physical Education for Women

WILMA J. PESAVENTO, Head of the Department

HELEN M. HEITMANN, Supervisor of the Professional Program in Teacher Education

MARY E. MCQUIETY, Supervisor of the General Education Program

LINDA L. BAIN, Supervisor of the Elementary Education Program

### Professors

Helen M. Barton, Ed.D. (Emerita); Dorothy Gillanders, Ph.D.

### Associate Professors

Helen M. Heitmann, D.P.E.; Wilma Pesavento, Ph.D.

### Assistant Professors

Linda L. Bain, M.S.; Mary A. DiVito, Ed.M.; Marian E. Kneer, Ed.S.; Carol J. Ladwig, M.S.; Mary McQuiety, M.S.; Lorraine L. Owen, M.S.; Frances Sweeney, M.A.

### Instructors

Emily Axelrod, M.S.; Michelle Emmett, M.S.; Mary Kapsalis, M.S.; Anne Klinger, M.A.; Janice McCaleb, M.S.; Nina K. Pappas, M.S.

### Assistants

Karen L. Beck, B.S., Arla F. Franchi, B.A.; Carol A. Galas, B.S.; Arthur W. Henderson, B.M.; Dorothy Hjermstad, B.A.; Dalia E. Grigaitis, B.A.; Concetta Licausi, B.S.; N. Faye Peterson; Ruth G. Thomas, B.S.; Erna Wachtel.

Two options are available to the student who seeks the degree of Bachelor of Science in Physical Education for Women:

Option I—For the high school teaching certificate: minimum of 196 quarter hours of credit.

Option II—For the special certificate for teaching grades 1 through 12: minimum of 195 quarter hours of credit.

### Required Courses for Options I and II

General Education, 67 hours

Hours

Rhetoric 101, 102

8

Biological Sciences 100, 101, 102—General Biology

12



Biological Sciences 133, 134—Human Biology	10
Humanities (Approved departmental sequences)	12
Mathematics	3-5
Psychology 100—Introduction to Psychology	4
Speech 100—Principles of Effective Speaking	3
Speech 101—Effective Speaking	2
Health Science 180—Personal and Community Health	3
History 152 or 153—History of the United States to the 1820's; from the 1820's to the 1890's	4
Political Science 151—American Government: Organization and Powers	4

*Education, 28 hours*

Education 170—Educational Foundations	4
Education 210—The Educational Process	4
Education 230—Curriculum and Instruction in Secondary Schools	4
Education 250—Educational Evaluation	4
Education 270—Educational Practice with Seminar	12

**Courses in the Major**

*Activity Courses, 18 hours*

PEW 110, 111, 112, 113 or 115—Beginning, Advanced Beginning, Intermediate, Advanced, or Synchronized Swimming	1
PEW 152—Soccer and Speedball	1
PEW 153—Stunts, Tumbling, and Trampoline	1
PEW 154—Volleyball, Track and Field	1
PEW 155—Gymnastics and Apparatus I	1
PEW 156—Swimming II	1
PEW 157—Basketball I and Softball	1
PEW 159—Basketball II and Field Hockey	1
PEW 168—Gymnastics and Apparatus II	1
PEW 201—Archery and Golf	2
PEW 203—Badminton and Tennis	2
Dance 100—Creative Dance	1
Dance 235—Folk, Square, and Ballroom	3
PEW Elective	1

*Theory and Supervised Teaching Courses, 47 hours*

PEW 150—Professional Orientation	3
PEW 151—Body Mechanics and Basic Movement	1
PEW 200—Teaching of Dance and Gymnastics	4
PEW 204—Supervised Teaching of Dance and Gymnastics	2
PEW 205—Tests and Measurements in Physical Education	4
PEW 213—Teaching of Sports	4
PEW 214—Supervised Teaching of Sports	1
PEW 222—Physical Education in Elementary and Secondary Schools	3
PEW 230—Kinesiology	5
PEW 250—Organization and Administration of Physical Education	4
PEW 280—History of Sports	4

PEW 281—First Aid	4
PEW 282—Organization of the School Health Program	4
PEW 283—History and Philosophy of Physical Education	4

These courses are also required of students who select Option II

*Elementary School Physical Education Activities*, 6 hours

PEW 166—Elementary School Games	3
Dance 200—Dance in the Elementary School	3

*Additional Requirements*

- Option I, 36 hours
  - Minor and electives
- Option II, 29 hours
  - Electives

### Teacher Education Minor in Physical Education for Women

<i>Courses</i>	<i>Hours</i>
PEW 281, PEW 282, and PEW 283	12
PEW 213 and PEW 214	5
(or PEW 200 and PEW 204)	(6)
PEW 151, PEW 153, PEW 155	3
Dance 100	1
PEW 152, PEW 154, PEW 157 (select 2)	2
PEW 201 or PEW 203	2
PEW 110, PEW 111, or PEW 112	1
PEW 142, PEW 143, or PEW 144	1
Physical education, health education, and dance electives	2-3

### Honors

The School of Physical Education grants honors at graduation to superior students. To qualify for honors, the student must have at least a 4.0 grade-point average for all university work taken on the Chicago Circle campus.

# Courses of Instruction

Courses are grouped alphabetically. Following the number and title of each course is a statement of credit given, content and prerequisites (if any).

*Definition of a Credit Hour:* A University credit hour represents one classroom hour of fifty minutes weekly for one quarter, in lecture or recitation, and either the necessary preparation time or a longer time in laboratory or other exercises for which outside preparation is not required. It is expected that most students will spend two hours preparation for one hour per week of lecture or recitation. Each University quarter-hour credit is thus understood to represent at least three hours of the student's time, and the credit value of a course is calculated in quarter hours on that basis.

Courses for freshmen and sophomores are numbered 100 to 199; for juniors and seniors, 200 to 399. See the appropriate Timetable for the final course offerings for each quarter.

The letters F, W, S, and Su indicate, when used, the quarter in which the course is offered.

**CC 299. The Contemporary University.** 2 to 4 hours, depending on the topic covered in a given quarter. May be repeated once for credit with consent of the instructor; total credit may not exceed 4 hours. Examination of selected problems in the philosophy, organization, methodology, and governance of the university. Prerequisite: Junior standing or consent of the instructor.

## **ACCOUNTING (Actg)**

**100. Accounting I.** 3 hours. Concepts and principles underlying the processing and reporting of accounting information for decision making. Prerequisite: Sophomore standing.

- 101. **Accounting II. 3 hours.** Internal control as it affects the processing of accounting information; relationship between assets and earnings; effects of valuation methods on income determination. Prerequisite: Actg. 100.
- 102. **Accounting III. 3 hours.** Managerial use of accounting information in decision making and planning; standards and budgets as a guide to measuring operating performance. Prerequisite: Actg. 101.
- 300. **Managerial Cost Accounting. 4 hours.** Analysis of costs for control, decision making, and planning; standards and budgets as a guide to measuring operating performance. Prerequisite: Actg. 302.
- 301. **Asset Valuation and Income Determination. 4 hours.** The development, applications, and limitations of accounting theory as related to the valuation of assets and measurements of income. Prerequisite: Actg. 102.
- 302. **Accounting for Entity Interest. 4 hours.** Accounting for rights of creditors, stockholders, and partners in a going concern; effects of expansion and contraction on equities; basic principles of fiduciary and fund accounting. Prerequisite: Actg. 301.
- 303. **Auditing. 4 hours.** The history, function, and theory of auditing; nature of the necessary evidence for the accountant's professional opinion concerning a financial position and the results of enterprise operations; applications of statistical sampling; auditing computerized systems. Prerequisites: Actg. 300, 301, 302.
- 304. **Federal Income Tax. 4 hours.** Concepts of federal income tax; its effects on decisions of corporations, partnerships, individuals, and trusts. Prerequisite: Actg. 300.
- 305. **Planning and Control. 4 hours.** The budget as a formal plan of action; the effect of decision making, forecasting, and uncertainty on the determination of enterprise goals; guidance techniques for the accomplishment of the planned objectives of a firm. Prerequisite: Actg. 300.
- 306. **Reading and Advanced Problems. 4 hours.** Consolidated statements, foreign subsidiaries, insurance, estates, theory, general statements. Prerequisite: Actg. 302.

## ADMINISTRATION OF CRIMINAL JUSTICE (CrJ)

Asterisks (\*) indicate general education credit in social sciences.

- \*101. **Administration of Criminal Justice. 4 hours.** The development and contemporary operation of the agencies of criminal justice, from police proce-

dures through the prosecution and judiciary, to correctional institutions, including probation and parole. Emphasis is on current philosophies and practices.

210. **Criminalistics. 4 hours.** Operations undertaken in a crime laboratory to examine and evaluate evidence in criminal and civil investigations; firearms and tool identification, drug and narcotics analyses, seriology microscopy of trace materials, and forensic instrumental analyses. Prerequisites: CrJ. 101, 251, and 259, or consent of the instructor.
212. **Forensic Science. 4 hours.** Introduction to the diverse fields of forensic science: pathology, toxicology, criminal psychology, detection of deception, and document examination; role of the sciences in the administration of criminal justice; examination of the current approaches to the identification of criminal homicide. Prerequisites: CrJ. 101, 210, 251, and 259, or consent of the instructor.
220. **Information and Communication Systems. 4 hours.** Review of the available technology in the communication and information fields; assessment of the introduction and application of scientific "hardware" and "software" to the administration of criminal justice at all levels. Historical development of communication and information systems in law enforcement. Prerequisites: CrJ. 101, 251 and 258, or consent of the instructor.
231. **Criminology. 4 hours.** Same as Sociology 231. The nature and extent of crime in American society; assessment and evaluation of the various factors and influences that lead to criminal behavior; various measures proposed for the control of criminal behavior. Prerequisite: 8 hours of sociology.
232. **Juvenile Delinquency. 4 hours.** Same as Sociology 232. Various conceptions of the nature of juvenile delinquency and its causes; the juvenile-court movement; juvenile detention, treatment of juvenile offenders; delinquency control programs. Prerequisite: CrJ. 231.
- \*251 **Foundations of Criminal Justice. 4 hours.** The development of law as a means of social control, from earliest records through Hammurabi, the Greek and Roman civilizations, European cultures, Anglo-Saxon Britain, the common law, to the present constitutional, statutory, and case law controls in the United States. Prerequisites: Psch. 100 and Soc. 100.
257. **The Development of Police Systems in Society. 4 hours.** The historical development of law enforcement, from earliest beginnings through Anglo-Saxon England to the present systems and operations. A comparative study of the theories and operations of police systems throughout the world. The structure and interrelationships of American police agencies on the federal, state, county, and municipal levels. Prerequisites: CrJ. 101 and 251 or consent of the instructor.



- 258. Police Administration. 4 hours.** The principles of administration and management in their application to law enforcement; a study of the police organizational structure. Responsibilities and interrelationships of administrative and line-and-staff services. An analysis of the functional divisions of a modern police operation in its application to public-safety needs of the community. Prerequisites: CrJ. 101 and 251 or consent of the instructor.
- 259. Principles of Criminal Investigation. 4 hours.** Theory and practice of investigation; study of the possible applications of the philosophical principles of deductive and inductive reasoning to criminal investigation. The scientific fact-finding approach in development of factual data from persons and things. The development and practice of criminal investigation in the field of law enforcement. Prerequisites: CrJ. 101 and 251 or consent of the instructor.
- 280. Theories of Sanctions, Deterrents, and Rehabilitation. 4 hours.** Analytical examination of the historical philosophies and practices of sanctions for criminal acts. Evaluation of modern approaches to the disposition of offenders, including sentencing, capital punishment, incarceration, fines, and rehabilitation programs. Prerequisite: Junior standing or consent of the instructor.
- 335. Organized Crime in the United States. 4 hours.** The development of organized crime throughout history; detailed consideration of the political, social, and economic conditions involved in the appearance, spread, and expansion of organized crime in America. Prerequisites: CrJ. 101, 251, and Soc. 225, 276 and 331 or consent of the instructor.
- 339. Institutional Treatment of Offenders. 4 hours.** The role of the custodial and correctional institutions in the treatment of the offender; philosophy of administration and management of institutions; survey of historical development and current trends in jails and prisons. Prerequisites: CrJ. 101, 251 and Soc. 225, 276, or consent of the instructor.
- 345. Community Treatment of Offenders. 4 hours.** The history and development of programs relating to community treatment of offenders; examination of the philosophies and programs dealing with the rehabilitation and reintegration of the offender into society. Prerequisites: CrJ. 101, 251 and Soc. 225, 276, or consent of the instructor.
- 350. The Role of Law Enforcement in Community Relations. 4 hours.** Analysis of the relationship between law enforcement and the social structure of the community, including an examination of the significant problem areas involving minority elements, cultural and ethnic groups, power and social-elite and political and social-action movements. Prerequisite: CrJ. 101 251, Soc. 225, 276, and PolS. 205, or consent of the instructor.

351. **Criminal Law I: Substantive Criminal Law. 4 hours.** Required in the curriculum in the administration of criminal justice; cannot be substituted for a criminal law course taken by law students. General doctrines of criminal liability in the United States; classification of crimes as against persons, property, and the public welfare. Emphasis on the concept of governmental sanctions of the conduct of the individual. Prerequisites: CrJ. 101, 251, and Soc. 225, 276, or consent of the instructor.
352. **Criminal Law II: Criminal Procedure. 4 hours.** Required in the curriculum in the administration of criminal justice; cannot be substituted for a criminal law course taken by law students. The criminal process. Legal problems associated with the investigation of crime, the acquisition of evidence, the commencement of a criminal proceeding, the prosecution and defense of charges, sentencing and appeal. Principal concern is with the development of existing procedures and examination of current efforts for reform. Prerequisite: CrJ. 351, or consent of the instructor.
353. **Criminal Law III. The Instrumentalities of Criminal Justice. 3 hours.** Required in the curriculum in the administration of criminal justice, cannot be substituted for a criminal law course taken by law students. Continues Criminal Justice 352. Examination of the agencies which play significant roles in the criminal process. Functions of the law enforcement agency, counsel, and the courts. Particular emphasis on the responsibilities and interrelationships of the agencies examined. Prerequisite: CrJ. 352, or consent of the instructor.
354. **Evidence. 4 hours.** The rules of evidence as they apply to judicial proceedings and administrative hearings relative to the criminal process. Development of the underlying rationale of the rules. Emphasis on the relationship between methods of evidence collection and admissibility. Prerequisite: CrJ. 353 or consent of the instructor.
360. **Industrial and Commercial Security Administration. 4 hours.** Theories and philosophy of the administration of industrial and commercial security functions; survey of contemporary organization and management of security operations; application of law enforcement principles within private enterprise. Prerequisites: CrJ. 257, 258, 259, or consent of the instructor.
391. **Proseminar in Criminal Justice. 4 hours.** Study in depth of current issues, problems, and developments of serious concern within the field of the administration of criminal justice. Prerequisites: CrJ. 101, 251, Soc. 225, 276, PolS. 205, and senior standing or consent of the instructor.
399. **Independent Study. 4 hours.** For administration of criminal justice majors only. Independent study and research, under the direct supervision of a faculty member, on a subject or subjects not covered in the regular curriculum. Prerequisites: Consent of the instructor by preregistration in the Curriculum Office, Soc. 225, 276, PolS. 205, and at least five criminal justice courses, including CrJ. 101 and 251.

**ANTHROPOLOGY (Anth)**

Asterisks (\*) indicate General education credit in social sciences.

- \*130. Introduction to Physical Anthropology. 4 hours.** Required for anthropology majors. Human origins and developments; emphasis on fossil man and races.
- 133. Human Biology I. 5 hours.** Same as Biological Sciences 133. Survey of the structure and functions of the human body; interrelationships of the various organs and systems. Lecture, laboratory. Prerequisite: 1 year of Biological Sciences or consent of the instructor.
- 134. Human Biology II. 5 hours.** Same as Biological Sciences 134. The morphology and physiology of the human body, with emphasis on the interrelationships of the various organs and systems. Three lectures and 6 hours of laboratory per week. Prerequisite: Anth. 133.
- \*150. Introduction to Archaeology. 4 hours.** Required for Anthropology majors. General survey of world archaeology; special reference to origins and development of Old World cultures.
- \*160. Introduction to Social Anthropology. 4 hours.** Required for anthropology majors. Survey of selected cultures of the world; emphasis on the concepts and methods of ethnology and social anthropology.
- 200. Social and Cultural Theory. 4 hours.** Required for anthropology majors. Theoretical approaches to the study of culture and society in terms of structure, function, and process. Prerequisite: Anth. 160 or consent of the instructor.
- 213. Kinship and Social Structure. 4 hours.** Required for anthropology majors. Introduction to the study of social systems, with particular reference to kinship systems, lineage organizations, and collateral groupings as they structure social organization in primitive societies. Prerequisite: Anth. 160 or consent of the instructor.
- \*215. Dynamics of Culture. 4 hours.** An introduction to the study of culture change, including the concepts of acculturation, culture contact, and diffusion. Prerequisite: Anth. 160 or consent of the instructor.
- 219. Language and Culture. 4 hours.** Language as an aspect of culture, the influence of culture on language, and the cultural role of semantic ambiguity. Attention is given to the problems of language in ethnographic field research and to problems of translation between cultures. Prerequisite: Anth. 160 or consent of the instructor.

230. **Bio-Anthropology. 4 hours.** The major principles of physical anthropology: human evolution, anthropometry, and functional anatomy; genetics and race; growth and constitution. Prerequisite: Anth. 130 and one year of biological sciences.
231. **Principles of Human Evolution. 4 hours.** Required for anthropology majors. The early and current theories prevalent in physical anthropology and the significance of these theories in contemporary research in biological anthropology. Prerequisites: Anth. 130 and BioS. 100, 101, and 102 or consent of the instructor.
245. **Theory in Archaeology. 4 hours.** Required for anthropology majors. Analysis of the methods and objectives of archaeology in the setting of behavioral science. Emphasis is given to current trends in prehistoric archaeology. Prerequisite: Anth. 150.
250. **Old World Archaeology I. 4 hours.** The evolution of the Old World hunting/collecting cultures to the end of the pleistocene. Prerequisite: Anth. 150.
251. **Old World Archaeology II. 4 hours.** Introduction to the prehistoric cultures of the Old World, the post-Pleistocene hunting/collecting cultures and the Stone Age farming cultures. Prerequisite: Anth. 250.
252. **New World Archaeology I. 4 hours.** Introduction to the prehistoric cultures of the New World from the populating of the Americas to the beginning of the formative cultral period in the Americas. Prerequisite: Anth. 150.
253. **New World Archaeology II. 4 hours.** Introduction to the prehistoric cultures of the New World from the formative cultural period to the high civilizations of Mesoamerica and South America. Prerequisite: Anth. 252.
255. **Field Methods of Archaeology. 6 to 12 hours.** Supervised participation in field research. Techniques and procedures are discussed and practiced under actual field conditions at an off-campus location. Prerequisite: Anth. 150 and consent of the instructor.
- \*261. **Ethnography of Mesoamerica. 4 hours.** Preconquest civilization of Mesoamerica, the interaction of Spanish and indigenous cultures, and the present Indian cultures of this area. Prerequisite: Anth. 160 or consent of the instructor.
- \*263. **Ethnography of Africa. 4 hours.** A survey of the culture areas of sub-Saharan Africa and study, in the ethnographic present, of societies typical of each culture area. Prerequisite: Anth. 160 or consent of the instructor.



- \*264. **Ethnography of North America.** 4 hours. A survey of the indigenous cultures of the Indians of North America, including some studies in culture contact. Prerequisite: Anth. 160 or consent of the instructor.
- \*265. **Ethnography of South America.** 4 hours. A survey of the indigenous cultures in South America in the ethnographic present. Prerequisite: Anth. 160 or consent of the instructor.
- \*267. **Ethnography of the Philippines.** 4 hours. A survey of selected indigenous cultures of the Philippine Islands; emphasis on subsistence patterns and social organization. Prerequisite: Anth. 160.
- 270. **Introduction to Anthropological Linguistics.** 4 hours. Required for anthropology majors. The concepts and techniques of anthropological linguistics with emphasis on its significance in the study of culture and society. Prerequisite: Anth. 160 or consent of the instructor.
- 295. **Seminar in Anthropology.** 2 to 4 hours. May be repeated for a total of 8 hours of credit. Reading, study, and discussion of selected problems in anthropology, for majors in anthropology; open, with the approval of the department, to seniors minoring in anthropology. Prerequisites: Junior standing and a major in anthropology or a minor in anthropology and approval of the department.
- 299. **Honors Course.** 4 hours. May be repeated for an additional 4 hours of credit. Individual study or research projects. Prerequisites: Senior standing, anthropology major, and 4.000 all-University average or consent of the instructor. **F, W, S**
- 310. **Peasant Societies.** 4 hours. Research and reading in the comparative study of peasant societies in diverse regions of the world. Special emphasis, during lecture and discussion, on a critical review of the anthropological literature delineating a peasant stratum of social organization and defining its characteristics. Prerequisites: Junior standing and 8 hours of social anthropology, or 8 hours of sociology, and consent of the instructor.
- 311. **Cultural Problems in Urbanization.** 4 hours. The processes of urbanization and of cultural and societal adjustment to urban life; case studies illustrate the variety of adjustments to urban life. Prerequisite: Anth. 213 or consent of the instructor.
- 314. **Kinship, Family, and Household.** 4 hours. Comparative study of the institutions of marriage, family, and household; the extension of kinship norms and values to other aspects of culture and society. Prerequisite: Anth. 213 or consent of the instructor.
- 315. **Comparative Religious Movements.** 4 hours. Analysis of religious behavior; special reference to the emergence of messianic cults in Africa and Melanesia,



and among the North American Indians and New World Negroes. Prerequisites: Junior standing and 8 hours of social anthropology, or 8 hours of sociology, and consent of the instructor.

316. **Economic Life of Primitive Peoples.** 4 hours. Patterns of production, distribution, and consumption in non-Western cultures. Cultural variation in attitudes toward labor, concepts of property, and prestige and wealth. Prerequisite: 8 hours of social anthropology including one 200-level course, or consent of the instructor.
317. **The Cross-Cultural Study of Social Control.** 4 hours. Cultural—jural structure in non-western societies; modes of dispute settlement, nature and range of sanctions, and processes of social control. Prerequisite: Anth. 160 or consent of the instructor.
320. **Culture and Personality.** 4 hours. An introduction to the concepts, theories, and techniques of studies relating the psychology of the individual to his culture and the results of some of these studies in selected nonliterate societies. Prerequisites: Anth. 160 and an introductory course in psychology, or consent of the instructor.
321. **Cultural Evolution.** 4 hours. Critical review of theories of cultural evolution; examination of ethnographic materials and data on cultural change and cultural contact for the purpose of examining the mechanisms of change. Prerequisite: Anth. 200 or consent of the instructor.
322. **Comparative Methods in Social Anthropology.** 4 hours. Introduction to the several kinds of comparative method, including field work, and small-sample and large-sample studies. Prerequisites: Anth. 213 and Soc. 185 or the equivalents, or consent of the instructor.
327. **Primitive Political Systems.** 4 hours. An examination of data and theory pertinent to non-western political systems; a cross-cultural study of political behavior. Prerequisite: Anth. 213 and junior or senior standing, or consent of the instructor.
331. **Human Evolution.** 4 hours. Same as Biological Sciences 331. Phylogeny of the primate order and the problems of speciation; particular emphasis on the relative roles of culture and nature as selective forces in human evolution. Prerequisite: Anth. 230 or 231, or BioS. 282 or 318.
350. **Prehistoric Archaeology.** 4 hours. Archaeological field techniques and principles of the study of prehistory. Case studies from selected areas of the Old and New Worlds. Prerequisite: Anth. 251 or 253.
351. **Prehistory of the Near East.** 4 hours. Consideration of southwestern Asia and northeastern Africa as the core area in which the first civilization

emerged. Emphasis on the late Quarternary to about 5000 B.C., with regard to the interrelationships between changing environment, human ecology, and cultural evolution. Prerequisite: Anth. 251 or consent of the instructor for qualified students from other departments.

352. **Early Civilization of the Old World. 4 hours.** Early civilization and incipient urbanization in Eurasia and Africa, focusing on the development of urban centers and archaic states; attention to preconditioning factors in the post-Pleistocene, Mesolithic, and Neolithic Ages. Prerequisite: Anth. 251 or 351.
355. **Field Problems in Archaeology. 6 to 12 hours.** Application of advanced techniques to the solution of special problems of archaeological field investigations; laboratory analysis under actual field conditions at an off-campus location. Prerequisites: Anth. 253 or 255, or concurrent registration in Anth. 255, and consent of the instructor.
361. **Problems in Mesoamerican Ethnology. 4 hours.** Intensive investigation of selected problems from the Mesoamerican area, with special emphasis on religion, economics, and social organization. Prerequisite: Anth. 261 and reading knowledge of Spanish, or consent of the instructor.
362. **Problems in African Ethnology. 4 hours.** A survey of the indigenous cultures of Africa; native cultures as reconstructed coterminous with their early historical contacts with the Western world; some additional data on present-day African cultures. Prerequisites: Anth. 263 and junior standing or consent of the instructor.
363. **Urban Cultures of Africa. 4 hours.** Lecture, research, and reading course on the indigenous urban centers of sub-Saharan Africa and the multicultural and multiracial metropolitan areas of colonial and contemporary Africa; special reference to the processes of segregation and detribalization. Prerequisite: Anth. 263 or 362 or consent of the instructor.
364. **Problems in North American Ethnology. 4 hours.** Intensive reading and research focusing on special problems of religious, economic, and social systems of New World native peoples. Prerequisite: Anth. 264 or consent of the instructor.
365. **Problems in Pacific Ethnology. 4 hours.** Ethnological survey of the indigenous peoples of Micronesia, Polynesia, Melanesia, and Australia; special emphasis on the social, economic, and religious life of representative groups. Prerequisites: Junior standing and 8 hours of social anthropology or consent of the instructor.
368. **Problems in European Ethnology. 4 hours.** Study in depth of selected case materials. Emphasis on community structure, kinship, religious and economic systems, and methods of social control; research techniques and the nature of source materials are considered. Prerequisite: Anth. 213.

399. **Independent Study. 2 to 12 hours.** May be repeated for credit but not for more than 12 hours. Independent study under the supervision of a staff member. Prerequisites: Junior standing and approval of the department.

## ARCHITECTURE (Arch)

101. **Architectural Design I. 6 hours.** Architectural design problems; emphasis on the development and organization of space. Prerequisite: A & A 104.
102. **Architectural Design II. 6 hours.** Architectural design problems; emphasis on structure. Prerequisite: Arch. 101.
111. **Building Technology I. 4 hours.** Wood and masonry construction and allied materials. Prerequisite: Concurrent registration in Arch. 102.
121. **Statics and Strength of Materials I. 3 hours.** Equilibrium of bodies and systems subjected to parallel, colinear, parallel noncolinear, perpendicular, and general systems of concentrated forces. Distributed bonds, centroids, buoyancy, friction. Prerequisites: Math. 111 and 112.
122. **Statics and Strength of Materials II. 3 hours.** Stresses and strains in tension and compression; moment of inertia; torsion; bending; shear and moment diagrams; stresses in beam; combined bending and aerial load. Prerequisite: Arch. 121.
123. **Statics and Strength of Materials III. 3 hours.** Deflection of beams; statical indeterminacy; columns variation of stress and strain at a point; ultimate load, failure and safety. Prerequisite: Arch. 122.
201. **Architectural Design III. 6 hours.** Architectural design problems; emphasis on environment control. Prerequisite: Arch. 102.
202. **Architectural Design IV. 6 hours.** Comprehensive design problem incorporating site planning. Prerequisite: Arch. 201.
203. **Architectural Design V. 6 hours.** Comprehensive design problems. Prerequisite: Arch. 202.
204. **Architectural Design Problems. 6 hours.** Comprehensive design problems. Prerequisite: Arch. 203.
211. **Building Technology II. 4 hours.** Steel construction and allied materials. Prerequisite: Arch. 111.
212. **Building Technology III. 4 hours.** Concrete materials and allied construction. Prerequisite: Arch. 211.

213. **Building Technology IV.** 4 hours. Electricity, illumination, and acoustics. Prerequisite: Arch. 212.
214. **Building Technology V.** 4 hours. Mechanical equipment, sanitation, heating and air conditioning. Prerequisite: Arch. 213.
215. **Building Technology VI.** 4 hours. Comprehensive architectural problems. Prerequisites: Arch. 214 and concurrent registration in Arch. 204.
221. **Structural Engineering I.** 3 hours. Loads on buildings. Algebraic and graphical analysis of beams and trusses. Sloping beams. Statically determinate space structures. Cable systems. Prerequisite: Arch. 123.
222. **Structural Engineering II.** 3 hours. Approximate analysis of frames. Moment distribution method. Energy principles. Model analysis. Prerequisite: Arch. 221.
223. **Structural Engineering III.** 3 hours. Foundation types and design. Design of masonry and timber structures. Prerequisite: Arch. 221.
224. **Structural Engineering IV.** 3 hours. Steel structures; properties of steel, design of tension members; columns; beams and connections. Design of steel buildings; roof trusses and rigid frames. Prerequisite: Arch. 222.
225. **Structural Engineering V.** 3 hours. Concrete structures; properties of concrete and steel; design of columns, beams, slabs, two-way slabs, flat slabs, walls and foundations. Prerequisite: Arch. 222.
226. **Structural Engineering VI.** 3 hours. General problems in the selection and design of structural systems for buildings; structural design with aluminum, plastics, and other materials; elements of prestressed concrete; ultimate and plastic design; unconventional structural types. Prerequisites: Arch. 223, 224, and 225.
241. **Urban and Regional Planning I.** 3 hours. Man's efforts to shape the physical environment of his community. Contemporary methods of controlling urban development.
242. **Urban and Regional Planning II.** 3 hours. Historical perspective. Prerequisite: Arch. 241.
301. **Architectural Design VII.** 6 hours. Comprehensive architectural problems. Prerequisite: Arch. 204.
302. **Architectural Design VIII.** 6 hours. Comprehensive architectural problems. Prerequisite: Arch. 301.

309. **Architectural Design Thesis.** 6, 9, or 12 hours. May be repeated for a total of 18 hours. Individual problems in architectural design. Prerequisite: Arch. 301.
311. **Forensic Architecture.** 3 hours. Legal problems in architecture. Prerequisite: Fifth year standing.
312. **Computer Analysis.** 3 hours. The use of electronic computers in building design and construction. Prerequisite: Arch. 226.
313. **Building Construction Systems.** 6 hours. Static and dynamic environmental control systems. Prerequisites: Arch. 204 and 215.
314. **Industrialized Building.** 3 hours. Prefabrication of building components. Prerequisite: Fifth year standing.
315. **Logistics of Building Construction.** 3 hours. Problems encountered in the logistics of building construction. Prerequisite: Fifth year standing.
316. **Environmental Control Systems.** 6 hours. Problems of color, illumination, heating and air conditioning systems, and acoustics. Prerequisite: Arch. 313.
319. **Building Technology Thesis.** 6, 9, or 12 hours. May be repeated for a total of 18 hours. Individual problems in building technology. Prerequisite: Arch. 313.
321. **Foundations.** 3 hours. Elements of soil mechanics; the selection and design of pile, caisson, raft, and other foundations. Prerequisite: Arch. 226.
322. **Structural Seminar I.** 3 hours. Selected topics in structural analysis and design. Prerequisite: Arch. 226.
323. **Intermediate Structural Analysis.** 6 hours. The analysis of statically indeterminate coplanar and space structures. Prerequisite: Arch. 226.
324. **Structural Dynamics.** 3 hours. Vibration, wind, and earthquake analysis and design of buildings. Prerequisite: Consent of the instructor.
325. **Structural Seminar II.** 3 hours. Continues Architecture 322. Prerequisite: Arch. 226.
326. **Intermediate Structural Design.** 6 hours. Plastic and limit methods of design, ultimate strength design, design of prestressed concrete members and structures. Prerequisite: Arch. 226.
329. **Structural Thesis.** 12 hours. Individual problems in structures. Prerequisite: Arch. 226.



339. **Architectural Humanities Thesis. 12 hours.** Individual problems in the architectural humanities. Prerequisite: 21 hours in history of architecture.
343. **Professional Practice. 3 hours.** Problems related to the practice of architecture. Prerequisite: Fifth year senior standing.

## ARCHITECTURE AND ART (A&A)

101. **Basic Design I. 3 hours.** The basic factors in two-dimensional and three-dimensional design.
102. **Basic Design II. 3 hours.** More complex systems of two-dimensional and three-dimensional design. Introduction to color theory. Prerequisite: A & A 101.
103. **Basic Design III. 3 hours.** Theory and application; form and structure; three-dimensional models of systems. Prerequisite: A & A 102.
104. **Basic Design IV. 3 hours.** Form-movement-light-time in the form of machines or sculpture. Prerequisite: A & A 103.
105. **Basic Design V. 3 hours.** Kinetic development of form, space, time, and movement devices. Prerequisite: A & A 104.
106. **Basic Design VI. 3 hours.** A sustained project involving the application of principles studies in Architecture and Art 104 and 105 with experimentation in various media. Prerequisite: A & A 105.
111. **Visual Communications I. 2 hours.** An introduction to the techniques.
112. **Visual Communications II. 2 hours.** Continues Architecture and Art 111. Prerequisite: A & A 111.
113. **Visual Communications III. 2 hours.** Symbolic systems, image forming, and typography. Prerequisite: A & A 112.
114. **Visual Communications IV. 2 hours.** Experimentation with the techniques and materials, including photography, used in two-dimensional expression. Prerequisite: A & A 113.
115. **Visual Communications V. 2 hours.** Communications of events or visual ideas in photography or cinematography. Prerequisite: A & A 114.
116. **Visual Communications VI. 2 hours.** Creative project involving application of ideas and techniques studies in Architecture and Art 114 and 115. Prerequisite: A & A 115.

141. **Man and Environment.** 3 hours. An introduction to the nature of the professions of architecture and art in terms of the subjective and objective factors of architectural activity.

## ART

100. **Art Today.** 3 hours. Architecture, painting, sculpture, film-photo, TV, mass media, and related areas, and the forces which generated the new visual experience.
101. **The Film as a Visual Art.** 3 hours. Growth and development of the film as an art form from the silent film to the present. The effect of film on visual attitudes and its relationship to other visual media, such as painting, communication design, and television.
103. **Art in a Technological Society.** 3 hours. The influence of technology on art and the impact of the resultant forms on society.
204. **Art for Elementary Teachers: Studies in Creativity.** 4 hours. Opportunity for the elementary education major to understand the creative process through this experience in art. Prerequisite: Junior standing.
205. **Foundations of Art Education.** 5 hours. Methods and techniques of art teaching, emphasizing creative and artistic development and the application of psychological and educational theories and practices to the teaching of art. Lecture, demonstrations, laboratory investigation. Prerequisites: Ed. 170 and 210.
213. **Art Education Theory.** 3 hours. Problem-solving evaluation and survey of pertinent studies and theories in art education. Prerequisite: Credit or concurrent registration in Art 205.

## BIOLOGICAL SCIENCES (BioS)

Asterisks (\*) indicate general education credit in natural sciences.

- \*100. **General Biology.** 4 hours. Same as Information Engineering 100. With Biological Sciences 101 and 102, a three-quarter sequence which may be entered in any quarter. Audio-tutorial. Principles and fundamentals of biology through examination of diverse phenomena unique to biological systems. Lecture, laboratory, and discussion. **F, Su**
- \*101. **General Biology.** 4 hours. Same as Information Engineering 101. Continues Biological Sciences 100. **W**
- \*102. **General Biology.** 4 hours. Same as Information Engineering 102. Continues Biological Sciences 101. **S**

133. **Human Biology I. 5 hours.** Same as Anthropology 133. Survey of the structure and functions of the human body; interrelationships of the various organ systems. Lecture and laboratory. Prerequisite: One year of biological sciences or consent of the instructor. **F.**
134. **Human Biology II. 5 hours.** Same as Anthropology 134. The morphology and physiology of the human body, with emphasis on the interrelationships of the various organs and systems. Three lectures and 6 hours of laboratory per week. Prerequisite: BioS. 133. **W**
193. **Honors Biology. 1 hour.** Open only to freshmen, sophomores, and juniors. An additional hour of related work for students registered in a course in biological sciences. May be repeated for 1 hour each quarter. Prerequisites: James Scholar status or approval of the department for superior students, registration in a biological sciences course (except BioS. 299 or 300) and consent of the instructor. **F, W, S**
200. **History of Biology. 3 hours.** Major problems and suggested solutions from the earliest records to the present. Prerequisite: Four quarters of laboratory science. **F**
201. **Topics in Plant Phylogeny. 4 hours.** Major events in the evolution of plants and selected aspects of current problems in plant phylogeny. Lecture, laboratory. Prerequisites: BioS. 100, 101, and 102 or the equivalents.
205. **Microtechnique. 4 hours.** Various methods of preparing animal and plant tissue for microscopic examination. Includes techniques and basic theories related to differential staining, histochemical and cytochemical reactions, and electron microscopy. Lecture and laboratory. Prerequisite: One year of biological sciences. **W**
210. **Selected Ideas in Regulatory Biology. 4 hours.** Topics will be chosen to illustrate the basic unifying principles in the biological sciences; emphasis on processes of biological thought. Lecture and laboratory. Prerequisites: One year of biological sciences and senior standing or consent of the instructor. **F**
211. **Selected Ideas in Evolutionary Biology. 4 hours.** Topics will be chosen to illustrate the basic unifying principles in the biological sciences; emphasis on processes of biological thought. Lecture and laboratory. Prerequisite: One year of biological sciences and senior standing or consent of the instructor. **S**
218. **Introduction to Paleontology. 4 hours.** Same as Geological Sciences 218. The phylogeny, morphology, and ecology of fossils; emphasis on the invertebrates. Two or three Saturday field trips are required. Prerequisite: One year of biological sciences or consent of the instructor. **F**

220. **Plant Taxonomy. 4 hours.** Classification and identification of flowering plants; emphasis on local flora. Lecture, laboratory, and occasional field trips. Prerequisite: One year of biological sciences. **S**
230. **Biology of Nonvascular Plants. 4 hours.** Structure and function in representative algae, fungi, slime-molds, and bryophytes in relation to their life cycles and phylogeny. Lecture and laboratory. Prerequisite: One year of biological sciences. **F**
232. **Plant Growth and Differentiation. 4 hours.** A study of the developmental sequences in respect to time, light, temperature, and nutrition of selected vascular and nonvascular plants. Lecture and laboratory. Prerequisite: One year of biological sciences.
240. **General Genetics. 5 hours.** Same as Information Engineering 283. Principles of heredity and variation illustrating the gene concept. Examples include animal, plant, microorganism, and human heredity. Lecture, laboratory, and recitation. Prerequisite: One year of biological sciences. Math 104, 105, 130 and organic chemistry are recommended. **F, W, S, Su**
250. **General Microbiology. 5 hours.** Introduction to the principal activities and properties of microorganisms, emphasizing fundamental concepts. Lecture and laboratory. Prerequisites: One year of biological sciences and credit or registration in organic chemistry. **W, Su**
260. **Biology of Human Reproduction. 3 hours.** No credit for biological sciences majors. The anatomy and physiology of the human reproductive system. Lecture. Prerequisite: One year of biological sciences. **W, S**
261. **Cellular Biodynamics. 5 hours.** Same as Information Engineering 284. The basic physiological activities common to cells; study of the functions characteristic of specialized cell types. Lecture and laboratory. Prerequisites: One year of biological sciences and Chem. 134 or 234. **F, W, S, Su**
280. **Vertebrate Morphogenesis. 5 hours.** Same as Information Engineering 280. An introduction to vertebrate anatomy with emphasis on early embryology and histology. Lecture and laboratory. Prerequisite: One year of biological sciences. **F, Su**
281. **Structure and Development of Vertebrates I. 5 hours.** Same as Information Engineering 281. With Biological Sciences 282, a two-quarter sequence. Evolution of vertebrate organ systems; their embryogenesis and microscopic and gross anatomy. Lecture and laboratory. Prerequisite: BioS. 280. **W**
282. **Structure and Development of Vertebrates II. 5 hours.** Same as Information Engineering 282. Continues Biological Sciences 281. Prerequisite: BioS. 281. **S**

299. **Individual Topics.** 3 to 5 hours. For qualified students wishing to carry out individual problems. Laboratory, conferences, and assigned readings. Prerequisites: Senior standing and approval of the department. **F, W, S**
300. **Seminar.** 0 to 1 hour. Faculty and visiting biologists discuss results of their research programs before staff and students at weekly meetings. Biological Sciences majors must enroll for two quarters in their senior year; one hour of credit will be given at the completion of the second quarter. Attendance of majors at all meetings is strongly encouraged. Prerequisites: Biological sciences major, junior standing. **F, W, S**
304. **Cytology Laboratory.** 3 hours. Advanced cytology; emphasis on instrumental methods. Prerequisites: BioS. 261 and concurrent registration in BioS. 309, or consent of the instructor. **F**
305. **Biostatistics.** 3 hours. A training course, for future professional biologists, in those statistical methods most useful in the design and analysis of biological investigations. Lecture and laboratory. Prerequisite: 20 hours of biological sciences or consent of the instructor.
307. **Biological Methods for Teachers.** 3 hours. Investigation of methodological subjects, conducted primarily as a practicum; emphasis on the development of competencies. Prerequisites: Senior standing and 40 hours of biological sciences. **W**
309. **Cytology.** 3 hours. Structure and functions of cells as revealed through historical development and modern research techniques. Lecture. Prerequisite: Two years of biological sciences. **F**
313. **Developmental Biology.** 4 hours. Principles governing growth and differentiation at molecular, fine structural, cellular, and organismic levels. Lecture and laboratory. Prerequisite: One year of biological sciences. **W**
315. **Principles of Ecology.** 3 hours. Composition and distribution of biotic communities, plant and animal; emphasis on the inter-play of physical and biological factors of the environment. Prerequisites: One year of biological sciences and concurrent registration in BioS. 324 or 380. **F, S**
316. **Invertebrate Paleontology.** 4 hours. Same as Geological Sciences 316. Phylogeny, morphology, and ecology of the fossil invertebrates. Prerequisites: BioS. 218 and consent of the instructor. **F**
318. **Vertebrate Paleontology.** 4 hours. Same as Geological Sciences 318. Phylogeny, morphology, and ecology of the fossil vertebrates. Prerequisites: One year of biological sciences and consent of the instructor. **S**
319. **Paleobotany.** 5 hours. Same as Geological Sciences 319. Structure, phylogeny, and stratigraphic distribution of representative fossil plants. Lecture, laboratory, and field trips. Prerequisite: One year of biological sciences. **F**



320. **Field Botany. 5 hours.** Flora and vegetation of the Chicago region. Lecture, laboratory, and field trips. Prerequisite: BioS. 220 or the equivalent. **Su**
321. **Plant Geography of North America. 4 hours.** Ecological and systematic treatment of vegetation regions and principal subdivisions; emphasis on environmental factors and floras. Prerequisite: BioS. 220 or 315. **W**
324. **Plant Ecology Laboratory. 2 hours.** Special attention to vegetation and environment of the Chicago region. Laboratory and field trips. Prerequisite: Concurrent registration in BioS. 315. **F, S**
328. **Plant Physiology I. 5 hours.** Plant relations to water and solutes; translocation; inorganic plant nutrition; photosynthesis; respiration. Lecture and laboratory. Prerequisite: One year of biological sciences. **W**
329. **Plant Physiology II. 5 hours.** Intensive study of the metabolism of carbon and nitrogen compounds and the physiology of growth and development. Lecture and laboratory. Prerequisite: BioS. 328 or consent of the instructor. **S**
331. **Human Evolution. 4 hours.** Same as Anthropology 331. Phylogeny of the primate order and the problems of speciation; particular emphasis on the relative roles of culture and nature as selective forces in human evolution. Prerequisite: Anth. 230 or 231, or BioS. 282 or 318. **F, S**
333. **Morphology of Vascular Plants. 4 hours.** The structure, reproduction, and evolutionary history of representative vascular plants, such as psilopsids, lycopsids, sphenopsids, ferns, gymnosperms, and angiosperms. Lecture and laboratory. Prerequisite: One year of biological sciences. **W**
342. **Cytogenetics. 4 hours.** Chromosomal phenomena involved in the mechanics of genetics, structure of genetic material, and the role chromosomal variation plays in the evolution of races and species. Lecture and laboratory. Prerequisite: BioS. 240. **F**
343. **Population Genetics. 3 hours.** Genetic dynamics for animal, plant, and human populations: mating systems, selection, sampling, and mutation. Lecture and recitation. Prerequisites: Consent of the instructor; or BioS. 240, Math. 130, and credit or concurrent registration in statistics. **W**
344. **Experimental Population Genetics. 3 hours.** Discussion of experimental and field empirical studies estimating genetic parameters, influence of selection, and other evolutionary forces on genotypes in populations. Lecture, laboratory, and discussion. Prerequisite: BioS. 343. **S**
345. **Systematics and Evolution. 3 hours.** Consideration of principles and interrelationships; basic analysis of evolutionary mechanisms; rationale for classification systems; nature of taxonomic characters. Lecture and discussion. Prerequisites: One year of biological sciences and BioS. 240. **W**

347. **Physiological Genetics. 5 hours.** Consideration of heredity at the biochemical level, particular reference to gene duplication, mutation, genetic control of protein synthesis, and genetic regulatory mechanisms. Lecture and laboratory. Prerequisites: BioS. 240 and Chem. 350.
349. **Evolutionary Theory. 3 hours.** Analysis of evolutionary mechanisms in plants and animals; variation and differentiation in populations and species; origins of superspecific taxa. Prerequisites: BioS. 315 and 345. **W**
350. **Advanced Microbiology. 5 hours.** Modern contributions to the cellular anatomy, physiology, and genetics of microorganisms. Lecture and laboratory. Prerequisites: BioS. 250 or 261 and credit or registration in biochemistry. Calculus is strongly recommended. **F**
351. **Virology. 3 hours.** Nature of viruses and their morphology, chemical composition, assay, host-parasite interactions, and life cycles. Prerequisites: BioS. 261, 350, Chem. 235, 350 or the equivalents.
353. **Chemical Biogenesis. 3 hours.** Same as Chemistry 353. Biosynthesis of important biological compounds. Lecture and discussion. Prerequisite: Chem. 134 or 234. **W**
356. **Mycology. 4 hours.** Analysis of the morphology, physiology, and genetics of fungi, as related to the taxonomy and phylogeny of fungi. Lecture and laboratory. Prerequisite: One year of biological sciences. **F**
359. **Neuroanatomy. 3 hours.** Same as Information Engineering 359. An introduction to the central nervous system using a programmed text and supplementary material in the form of visual aids and outside readings. Prerequisite: One year of biological sciences or consent of the instructor.
361. **Macromolecules of Biological Importance. 5 hours.** Nucleic acids and proteins; emphasis on their roles in the replication of genetic material. Lecture and laboratory. Prerequisites: A course in organic chemistry and consent of the instructor. **S**
363. **Animal Physiology I. 5 hours.** Same as Information Engineering 383. The role of the digestive, circulatory, respiratory, and osmoexcretory systems in the maintenance of organismic homeostasis. Emphasis on vertebrates. Lecture and laboratory. Prerequisite: BioS. 261. **F, Su**
364. **Animal Physiology II. 5 hours.** Same as Information Engineering 384. The role of the muscular, sensory, nervous, and endocrine systems in the maintenance of organismic integration. Emphasis on vertebrates. Lecture and laboratory. Prerequisite: BioS. 261. **W**
377. **Endocrinology. 5 hours.** The animal hormones in the control of integration, homeostasis, growth, and development. Lecture and laboratory. Prerequisite: BioS. 364. **W**

380. **Animal Ecology Laboratory.** 2 hours. Population and community assemblages of the Chicago region. Laboratory and field trips. Prerequisite: Concurrent registration in BioS. 315.
382. **Environmental Conservation.** 3 hours. Applied ecology of use of renewable natural resources; special emphasis on biotic problems of land, water, and air management; pollution, population increase, multiple-use concept, and land ethics. Lecture and field trips. Prerequisites: BioS. 315 and either 324 or 380. **F**
384. **Invertebrate Zoology I.** 5 hours. Comparative study of structure, development, behavior, classification, and evolution of the lower invertebrate groups. Lecture and laboratory. Prerequisite: One year of biological sciences. **W**
385. **Invertebrate Zoology II.** 5 hours. Comparative study of structure, development, classification, and evolution of the higher invertebrate groups exclusive of insects. Lecture and laboratory. Prerequisite: BioS. 384 or consent of the instructor. **S**
388. **General Entomology.** 5 hours. Introduction to the morphology, physiology, classification, behavior, and evolution of insects. Lecture and laboratory. Prerequisite: 24 hours of biological sciences. **F**
389. **Principles of Protozoology.** 5 hours. Introduction to the comparative morphology, physiology, and systematics of the protozoa, including discussion of advances in major areas of current research. Lecture and laboratory. Prerequisite: One year of biological sciences. **S**
393. **Functional Animal Morphology.** 4 hours. Functional analysis of selected invertebrate and vertebrate organ systems applied to problems of comparative structure, adaptation, and phylogeny. Lecture and laboratory. Prerequisites: Senior standing and consent of the instructor. **F**
395. **Zoogeography.** 3 hours. Examination of the present and past distribution of animals; emphasis on physiographic and ecologic factors which affect the development of faunal regions. Experimental methods to elucidate mechanisms of origin and diversification of island and continental faunas. Prerequisite: Senior standing.
397. **Biology of Lower Vertebrates.** 4 hours. Experimental and descriptive studies on fishes, amphibians and reptiles; emphasis on ecology, speciation, and adaptive radiation. Lecture, laboratory, and field trips. Prerequisite: BioS. 218, 240, or 280.

## BUSINESS LAW (BLaw)

310. **Managerial Jurisprudence.** 4 hours. Application of the legal function to business administration. Basic legal tools for business transaction and corporate operations; legal aspects of the major segments of business management. Prerequisite: Junior standing or Phase I MBA student standing.

## CHEMISTRY (Chem)

Asterisks (\*) indicate general education credit in natural sciences.

111. **Introduction to Chemistry.** 4 hours. For students without entrance credit in high school chemistry or inadequately prepared for Chem. 112. Prerequisite: Satisfactory performance on a placement examination. **F, W, S, Su**
- \*112. **Chemical Bonding and Structure.** 4 hours. For students with one year of high school chemistry and adequate preparation, as shown by placement examination. Atomic and molecular structure, chemistry of the covalent and ionic bond. Prerequisite: Chem. 111 or adequate performance on the placement examination. **F, W, S, Su**
- \*113. **Equilibria: Chemistry of Solutions.** 4 hours. Acid-base reactions, solubility relations, oxidation potentials; qualitative analysis. Prerequisite: Chem. 112 or superior performance on the placement examination or advanced placement or Chem. 117. College algebra or the equivalent is strongly recommended. **F, W, S, Su**
- \*114. **Structure and Reactivity.** 4 hours. Elementary thermodynamics and kinetics; electrochemistry. Prerequisite: Chem. 113 or advanced placement. **F, W, S, Su**
115. **Equilibria: Chemistry of Solutions (for Engineers).** 3 hours. Acid-base reactions, solubility relations, oxidation potentials; qualitative analysis. Prerequisite: Chem. 112 or superior performance on the placement examination or advanced placement or Chem. 117. College algebra or the equivalent is strongly recommended. **F, W, S**
116. **Structure and Reactivity (for Engineers).** 2 hours. Elementary thermodynamics and kinetics; electrochemistry. Prerequisite: Chem. 113. **F, W, S**
- \*117. **General and Analytical Chemistry I.** 5 hours. Primarily for students in the chemistry, chemical engineering, and physics curricula and natural science majors. Prerequisite: Superior performance on the placement examination. **F**

- \*118. General and Analytical Chemistry II. 5 hours.** Continues Chemistry 117. Prerequisite: Chem. 117 with a grade of C or higher. **W**
- \*119. General and Analytical Chemistry III. 5 hours.** Credit is not given for Chemistry 119 if the student has credit in 121. Continues Chemistry 118, with special emphasis on quantitative analysis. Prerequisite: Chem. 118. **S**
- \*121. Analytical Chemistry. 5 hours.** Credit is not given for Chemistry 121 if the student has credit in Chemistry 119. Volumetric, gravimetric and instrumental methods of analysis. Prerequisite: Chem. 114 or advanced placement. **F, W, S, Su**
- 132. Elementary Organic Chemistry. 5 hours.** Primarily for prenursing students. This course does not satisfy the organic chemistry prerequisite for biochemistry or for advanced courses in organic chemistry. Prerequisite: Chem. 112. **F, W, S, Su**
- 133. Basic Organic Chemistry I. 4 hours.** For students not majoring in chemistry. Structures, synthesis, and reactions of the more important classes of organic compounds. Prerequisite: Chem. 114.
- 134. Basic Organic Chemistry II. 4 hours.** Continues Chemistry 133. Prerequisite: Chem. 133.
- 221. The Study of Chemical Systems. 3 hours.** For students in the College of Engineering. Theoretical and experimental study of some aspects of the structure, properties, separation, and identification of chemical systems. Prerequisite: Chem. 116 or the equivalent.
- 233. Organic Chemistry I. 5 hours.** For chemistry majors and students in the chemistry and chemical engineering curricula. The first quarter of a three quarter sequence in organic chemistry. Prerequisite: Chem. 114 or 119. **F, W, S, Su**
- 234. Organic Chemistry II. 5 hours.** Continues Chemistry 233. Prerequisite: Chem. 233. **F, W, S**
- 235. Organic Chemistry III. 3 hours.** Continues Chemistry 234. Lectures and assigned reading. Prerequisite: Chem. 234 or permission of the department. **F, W, S, Su**
- 237. Organic Chemistry Laboratory. 2 hours.** Includes the opportunity for individual projects. Prerequisite: Credit or registration in Chem. 235. **F, W, S, Su**
- 281. Elements of Glass Blowing. 1 hour.** Demonstrations and practice in glass blowing and the construction of simple laboratory equipment. Prerequisites: Junior standing in chemistry and consent of the instructor.



282. **Chemical Literature.** 1 hour. Survey of chemical information sources and retrieval procedures. Prerequisites: 24 hours of chemistry and four quarters (or the equivalent) of German or Russian or French. **W, S**
285. **History of Science, with Particular Reference to Chemistry.** 3 hours. The historical development of leading ideas in science and chemistry. Prerequisite: 26 hours of laboratory science. **W, S**
292. **Senior Research.** 2 to 9 hours. Total credit must be at least 4 hours and must not exceed 9 hours. It is recommended that the student divide his work over two quarters. Prerequisites: Senior standing and written permission from the department and from the instructor under whom the student is to work. **F, W, S, Su**
315. **Inorganic Chemistry.** 4 hours. Lectures and assigned readings in structural inorganic chemistry, inorganic reaction mechanisms and techniques, and the nature of the coordinate bond. Prerequisite: Chem. 342 or the equivalent. **W**
316. **Inorganic Chemistry Laboratory.** 2 hours. Synthesis of inorganic compounds illustrating the use of modern preparative techniques. Prerequisite: Credit or registration in Chem. 315. **W**
318. **Inorganic Chemistry.** 4 hours. Lectures and assigned readings on the chemistry of selected elements. Prerequisite: Consent of the instructor. **S**
321. **Chemical and Instrumental Analysis I.** 4 hours. Chemical and instrumental methods of analysis and their application to the quantitative study of chemical reaction. Prerequisites: Chem. 235 and credit or registration in Chem. 343 or the equivalents. **F, W**
322. **Chemical and Instrumental Analysis II.** 3 hours. Continues Chemistry 321. Prerequisite: Chem. 321.
326. **Advanced Analytical Chemistry.** 4 hours. Analytical separation and experimental design of analytical methods. Prerequisite: Chem. 322.
338. **Systematic Identification of Organic Compounds.** 3 hours. Primarily a laboratory course; chemical, physical, and spectroscopic methods are used to separate, purify, and identify organic compounds. Prerequisite: Chem. 237. **W**
339. **Organic Synthesis.** 2 to 4 hours. Discussion and laboratory work involving special techniques in organic synthesis. Prerequisite: Chem. 237 or the equivalent.
340. **Physical Chemistry I.** 3 hours. Credit is not given for both the Chemistry 340-342-344 sequence and the 380-382 sequence. Introduction to the study of

chemical principles. Prerequisites: Chem. 119 or 121, credit or registration in Math. 133, and one year of college physics. **F**

341. **Physical Chemistry Laboratory I. 2 hours.** Quantitative experimental study of chemical principles. Prerequisite: Concurrent registration in Chem. 340. **F**
342. **Physical Chemistry II. 3 hours.** Continues Chemistry 340. Prerequisite: Chem. 340. **W**
343. **Physical Chemistry Laboratory II. 2 hours.** Continues Chemistry 341. Prerequisites: Chem. 341 and concurrent registration in Chem. 342. **W**
344. **Physical Chemistry III. 3 hours.** Continues Chemistry 342. Prerequisite: Chem. 342. **S**
345. **Physical Chemistry Laboratory III. 2 hours.** Continues Chemistry 343. Prerequisites: Chem. 343 and concurrent registration in Chem. 344. **S**
347. **Introduction to Quantum Chemistry. 4 hours.** Application of quantum mechanics to problems of chemical interest. Additional assignments are required. Prerequisite: Chem. 344. **F**
348. **Thermodynamics. 4 hours.** Lectures and assigned readings on thermodynamics; applications to chemical systems. Prerequisite: Chem. 344. **W**
349. **Statistical Thermodynamics. 4 hours.** Introduction to statistical mechanics and application to equilibrium thermodynamics. Individual projects are required. Prerequisite: Chem. 344. **S**
350. **General Biochemistry I. 3 hours.** Chemistry of biological systems, including enzymes, vitamins, nucleic acids, carbohydrates, and proteins. Prerequisites: Chem. 119 or 121, and 134 or 234. **F, W**
351. **General Biochemistry II. 3 hours.** Continues Chemistry 350. Prerequisite: Chem. 350. **S**
353. **Chemical Biogenesis. 3 hours.** Same as Biological Sciences 353. Biosynthesis of important biological compounds. Prerequisite: Chem. 134 or 234. **S**
355. **Biochemistry Laboratory I. 2 hours.** Introduction to experimentation with biochemical systems, processes, and compounds of biochemical importance. Prerequisite: Registration in Chem. 350.
357. **Biochemistry Laboratory II. 2 hours.** Continues Chemistry 355. Prerequisites: Chem. 355 and registration in Chem. 351.

361. **Advanced Organic Chemistry I.** 4 hours. A physical-organic approach to organic reactions with particular emphasis on reaction mechanisms and the relationship between reactivity and structure. Lectures and assigned readings. Prerequisites: Chem. 235 and 344. **F**
362. **Advanced Organic Chemistry II.** 4 hours. Continues Chemistry 361. Lectures and assigned readings. Prerequisite: Chem. 361. **W**
380. **Principles of Physical Chemistry I.** 3 hours. Credit is not given for both the Chemistry 380-382 sequence and the 340-342-344 sequence. Chemistry 380 and 382 provide an elementary introduction to physical chemistry; particular emphasis on topics of importance in the biological and health sciences. Prerequisites: Chem. 119 or 121, calculus, and two quarters of physics, or consent of the instructor. **W**
382. **Principles of Physical Chemistry II.** 3 hours. Continues Chemistry 380. Prerequisite: Chem. 380.
383. **Elementary Physical Chemistry Laboratory.** 1 hour. An introductory laboratory course. Prerequisite: Chem. 380. **S**
384. **Surface and Macromolecular Chemistry.** 3 hours. Interfacial phenomena, stability of disperse systems, properties of polymer solutions. Prerequisites: Chem. 382 or the equivalent and consent of the instructor.
385. **Surface and Macromolecular Laboratory.** 2 hours. Techniques in surface and macromolecular chemistry. Prerequisites: Credit or registration in Chem. 384 and consent of the instructor.
391. **Problems in the Teaching of High School Chemistry.** 4 hours. New approaches to the discussion and presentation of topics in general chemistry. Prerequisite: Experience in teaching high school chemistry.
393. **Topics of Modern Chemistry.** 4 hours. Lectures, demonstrations, discussions, and literature in specialized areas of chemistry, including analytical, inorganic, organic, and physical chemistry and biochemistry. Prerequisite: Consent of the instructor.
399. **Independent Study. Variable Credit.** 3 hours or more. May be repeated for credit. Supervised study in an area not represented by regularly offered courses. Prerequisites: Senior standing and written approval of the department. **F, W, S, Su**

## CLASSICS (CI)

Asterisks (\*) indicate general education credit in humanities.

- \*100. **Classical Etymology in the Life Sciences.** 2 hours. The structure and formation of technical terms used in the life sciences. **W, S, F**

- \*200. Greek Poetry in Translation. 4 hours.** Knowledge of Greek is not required. Classical Greek poetry from its beginning to the Byzantine period. **F**
- \*205. Roman Satire. 4 hours.** Knowledge of Latin is not required. Selections from Horace, Persius, Petronius, Seneca, Martial, and Juvenal. **W**
- \*211. Mythology of Greece and Rome. 4 hours.** Same as English 211. Myth and religion, history, folk tales, and literature. Open to sophomores with permission of the department. **W, S, F**
- \*215. The Intellectual Development of Greece. 4 hours.** Knowledge of Greek is not required. Selections from the philosophers, poets, historians, and scientists. Prerequisite: Junior standing.
- \*248. Greek Tragic Drama in Translation. 4 hours.** Same as English 249. Knowledge of Greek is not required. The plays of Aeschylus, Sophocles, Euripides. Prerequisite: Junior standing, or consent of the instructor. **Su, F**
- \*250. Greek Comedy in Translation. 4 hours.** Knowledge of Greek is not required. The plays of Aristophanes and Menander. Prerequisite: Junior standing or consent of the instructor.
- \*255. Roman Comedy in Translation. 4 hours.** Knowledge of Latin is not required. The plays of Plautus and Terence. Prerequisite: Junior standing or consent of the instructor.
- \*265. Greek and Roman Epic Poetry. 4 hours.** Knowledge of Greek and Latin is not required. The epic poems of Homer, Lucretius, Vergil and others in the Greco-Roman tradition. Prerequisite: Junior standing or consent of the instructor.

## **DANCE (Dance)**

- 100. Creative Dance. 1 hour.** Exploration of movement; rhythmic analysis; dance composition.
- 200. Dance in the Elementary School. 3 hours.** Study in the development of rhythmic patterns in children, evaluation and lesson planning in elementary school dance, presentation of materials, uses of accompaniment and types of percussion instruments suitable for children. Prerequisite: Junior standing and Dance 100 and 235.
- 235. Folk, Square, and Ballroom Dance. 3 hours.** Skills and techniques, rhythmic analysis, word cues, cultural history, and literature and music sources of folk, square, and ballroom dances.

**DESIGN (Des)**

201. **Colloquium. 1 hour.** Current problems in design presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: Completion of the foundation program.
202. **Communications Design. 2 hours.** Theory and application of the elements of communications design through experiments with image, letter, form, and illustration. Prerequisite: Completion of the foundation program.
203. **Communications Design. 3 hours.** Inventive exploration of applications of illustrative techniques combining word and image, collage, and imprinting. Prerequisite: Completion of the foundation program.
204. **Communications Design. 4 hours.** Free and controlled manipulation of symbol, type, drawing, and photoimage from the two-dimensional plane to volume. Prerequisite: Completion of the foundation program.
205. **Communications Design. 5 hours.** A comprehensive investigation of the elements and interrelations of communications design, demonstrated by research and analysis. Prerequisite: Completion of the foundation program.
206. **Typographic Design. 2 hours.** Theory and application of the elements of typography. Prerequisite: Completion of the foundation program.
207. **Typographic Design. 3 hours.** Visual communications projects based on the use of typographic elements and the study of basic printing methods. Prerequisite: Completion of the foundation program.
208. **Typographic Design. 4 hours.** Typographic projects, utilizing various printing processes. Prerequisite: Completion of the foundation program.
209. **Typographic Design. 5 hours.** Comprehensive projects involving type selection, representation, and organization preliminary to comprehensive presentation. Analysis of materials and production methods. Prerequisite: Completion of the foundation program.
210. **Colloquium. 1 hour.** Continues Design 201. Current problems in design presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: Des. 201.
211. **Communications Design. 2 hours.** Continues Design 202. Theory and application of the elements of communications design through experiments with image, letter, form, and illustration. Prerequisite: Any one of Des. 202 through 209.



212. **Communications Design. 3 hours.** Continues Design 203. Inventive exploration of applications of illustrative techniques combining word and image, collage, and imprinting. Prerequisite: Any one of Des. 202 through 209.
213. **Communications Design. 4 hours.** Continues Design 204. Free and controlled manipulation of symbol, type, drawing, and photoimage from the two-dimensional plane to volume. Prerequisite: Des. 204.
214. **Communications Design. 5 hours.** Continues Design 205. A comprehensive investigation of the elements and interrelations of communications design, demonstrated by research and analysis. Prerequisite: Any one of Des. 202 through 209.
215. **Typographic Design. 2 hours.** Continues Design 206. Theory and application of the elements of typography. Prerequisite: Any one of Des. 202 through 209.
216. **Typographic Design. 3 hours.** Continues Design 207. Visual communications projects based on the use of typographic elements and the study of basic printing methods. Prerequisite: Des. 207.
217. **Typographic Design. 4 hours.** Continues Design 208. Typographic projects, utilizing various printing processes. Prerequisite: Any one of Des. 202 through 209.
218. **Typographic Design. 5 hours.** Continues Design 209. Comprehensive projects involving type selection, representation, and organization preliminary to comprehensive presentation. Analysis of materials and production methods. Prerequisite: Any one of Des. 202 through 209.
219. **Colloquium. 1 hour.** Continues Design 210. Current problems in design presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: Des. 210.
220. **Communications Design. 2 hours.** Continues Design 211. Theory and application of the elements of communications design through experiments with image, letter, form, and illustration. Prerequisite: Any one of Des. 211 through 218.
221. **Communications Design. 3 hours.** Continues Design 212. Inventive exploration of applications of illustrative techniques combining word and image, collage, and imprinting. Prerequisite: Any one of Des. 211 through 218.
222. **Communications Design. 4 hours.** Continues Design 213. Free and controlled manipulation of symbol, type, drawing, and photoimage from the two-dimensional plane to volume. Prerequisite: Des. 213.

223. **Communications Design. 5 hours.** Continues Design 214. A comprehensive investigation of the elements and interrelations of communications design, demonstrated by research and analysis. Prerequisite: Des. 214.
224. **Typographic Design. 2 hours.** Continues Design 215. Theory and application of the elements of typography. Prerequisite: Any one of Des. 211 through 218.
225. **Typographic Design. 3 hours.** Continues Design 216. Visual communications projects based on use of typographic elements and the study of basic printing methods. Prerequisite: Des. 216.
226. **Typographic Design. 4 hours.** Typographic projects, utilizing various printing processes. Prerequisite: Des. 217.
227. **Typographic Design. 5 hours.** Continues Design 218. Comprehensive projects involving type selection, representation, and organization preliminary to comprehensive presentation. Analysis of materials and production methods. Prerequisite: Des. 218.
228. **Colloquium. 1 hour.** Current problems in design presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: Des. 219.
229. **Communications Design. 2 hours.** Inventive exploration of illustrative techniques combining word and image in communications design. Studies in application. Prerequisite: Any one of Des. 220 through 227.
231. **Communications Design. 4 hours.** Development of a significant comprehensive theme applicable to the problems of display, exhibition, stage, museum, exposition, and other areas. Research, planning, and scale-model making. Prerequisite: Any one of Des. 220 through 227.
233. **Colloquium. 1 hour.** Continues Design 228. Current problems in design presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: Des. 228.
234. **Communications Design. 2 hours.** Continues Design 229. Inventive exploration of illustrative techniques combining word and image in communications design. Studies in application. Prerequisite: Any one of Des. 229, 231, 330, 332.
235. **Communications Design. 3 hours.** An intensive project: long-range planning, development, coordination; analysis and research; presentation technique. Prerequisite: Any one of Des. 229, 231, 330, 332.

238. **Colloquium. 1 hour.** Continues Design 233. Current problems in design presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: Des. 233.
239. **Communications Design. 3 hours.** Continues Design 234. Inventive exploration of illustrative techniques combining word and image in Communications design. Studies in application. Prerequisite: Any one of Des. 234, 235, 336, 337.
240. **Communications Design. 3 hours.** Continues Design 235. An intensive project: long-range planning, development, coordination. Analysis and research; presentation techniques. Prerequisite: Any one of Des. 234, 235, 236, 337.
243. **Colloquium. 1 hour.** Current problems in design presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: Completion of the foundation program.
244. **Photography-Film. 2 hours.** Basic principles of photography or cinematography with introduction to camera, light meter, and printing techniques. Prerequisite: Completion of the foundation program.
245. **Photography-Film. 3 hours.** The camera as a means of recording. Interpreting complex volumes and situations. Projection by enlarging. Incorporation of other materials on photosensitive surfaces. Prerequisite: Completion of the foundation program.
246. **Photography-Film. 4 hours.** Light-design problems where objects and images are interrelated through darkroom techniques. Studies of multiple exposure, distortion, and color. Prerequisite: Completion of the foundation program.
247. **Photography-Film. 5 hours.** Photography or cinematography. A comprehensive experimental use of light as a creative and expressive medium; exploration of single and multiple projection through slides or motion pictures on flat, volumetric, or spatial surfaces, static or in motion.
248. **Colloquium. 1 hour.** Continues Design 243. Current problems in design presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: Des. 243.
249. **Photography-Film. 2 hours.** Continues Design 244. Further application of principles of photography or cinematography using camera, light meter, and printing techniques. Prerequisite: Any one of Des. 244, 245, 246, 247.

250. **Photography-Film. 3 hours.** Continues Design 245. The camera as a means of recording. Interpreting complex volumes and situations. Projection by enlarging. Incorporation of other materials on photosensitive surfaces. Prerequisite: Any one of Des. 244, 245, 246, 247.
251. **Photography-Film. 4 hours.** Light-design problems where objects and images are interrelated through darkroom techniques. Studies of multiple exposure, distortion, and color. Prerequisite: Des. 245.
252. **Photography-Film. 5 hours.** Continues Design 247. Photography or cinematography. A comprehensive experimental use of light as a creative and expressive medium, exploration of single and multiple projection through slides or motion pictures on flat, volumetric, or spatial surfaces, static or in motion. Prerequisite: Any one of Des. 244, 245, 246, 247.
254. **Photography-Film. 2 hours.** Continues Design 249. Further application of principles of photography or cinematography using camera, light meter, and printing techniques. Prerequisite: Any one of Des. 249, 250, 251, 252.
255. **Photography-Film. 3 hours.** Continues Design 250. The camera as a means of recording. Interpreting complex volumes and situations. Projection by enlarging. Incorporation of other materials on photosensitive surfaces. Prerequisite: Any one of Des. 249, 250, 251, 252.
256. **Photography-Film. 4 hours.** Continues Design 251. Light-design problems where objects and images are interrelated through darkroom techniques. Studies of multiple exposure, distortion, and color. Prerequisite: Des. 251.
257. **Photography-Film. 5 hours.** Continues Design 252. Photography or cinematography. A comprehensive experimental use of light as a creative and expressive medium; exploration of single and multiple projection through slides or motion pictures on flat, volumetric, or spatial surfaces, static or in motion. Prerequisite: Any one of Des. 249, 250, 251, 252.
258. **Colloquium. 1 hour.** Current problems in design presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: Des. 253.
259. **Photography-Film. 2 hours.** Introduction to photography or cinematography; experiments in various film-making and recording techniques. Prerequisite: Any one of Des. 254, 255, 256, 257.
263. **Colloquium. 1 hour.** Continues Design 258. Current problems in design presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: Des. 258.
264. **Photography-Film. 2 hours.** Continues Design 259. Introduction to photog-



raphy or cinematography; experiments in various film-making and recording techniques. Prerequisite: Any one of Des. 259, 360, 361, 362.

265. **Photography-Film. 3 hours.** Experimentation directed toward preparation for projects in photography or cinematography, audiovisual aids, television, and theatre. Prerequisite: Any one of Des. 259, 360, 361, 362.
268. **Colloquium. 1 hour.** Continues Design 263. Current problems in design presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: Des. 263.
269. **Photography-Film. 2 hours.** Continues Design 264. Introduction to photography or cinematography; experiments in various film-making and recording techniques. Prerequisite: Any one of Des. 264, 265, 366, 367.
270. **Photography-Film. 3 hours.** Continues Design 265. Experimentation directed toward preparation for projects in photography or cinematography, audiovisual aids, television, and theatre. Prerequisite: Any one of Des. 264, 265, 366, 367.
271. **Colloquium. 1 hour.** Current problems in design presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: Completion of the foundation program.
272. **Industrial Design. 2 hours.** An experimental approach to the utilization of functional structures, i.e., for support and suspension in tension and compression. Application of the foregoing principles to functional design. Prerequisite: Completion of the foundation program.
273. **Industrial Design. 3 hours.** Studies of two-dimensional and three-dimensional presentations, sequential analysis, photo recording, charts, diagrams, drawings, and other visual materials. Prerequisite: Completion of the foundation program.
274. **Industrial Design. 4 hours.** Systematic two-dimensional and three-dimensional investigation of communication elements as they relate to design and planning for display and exhibition design. Prerequisite: Completion of the foundation program.
275. **Industrial Design. 5 hours.** Analysis and planning preliminary to comprehensive projects involving the development of solutions to problems of production, logistics, and the like. Prerequisite: Completion of the foundation program.
276. **Colloquium. 1 hour.** Continues Design 271. Current problems in design presented by professionals active in the field. Provides a basis for planning,



executing, and evaluating projects in courses in the student's major field.  
Prerequisite: Des. 271.

277. **Industrial Design. 2 hours.** Continues Design 272. An experimental approach to the utilization of functional structures, i.e., for support and suspension in tension and compression. Application of the foregoing principles to functional design. Prerequisite: Any one of Des. 272, 273, 274, 275.
278. **Industrial Design. 3 hours.** Continues Design 273. Prototyping, production processes, material investigation. Prerequisite: Des. 273.
279. **Industrial Design. 4 hours.** Continues Design 274. Systematic two-dimensional and three-dimensional investigation of communication elements as they relate to design and planning for display and exhibition design. Prerequisite: Any one of Des. 272, 273, 274, 275.
280. **Industrial Design. 5 hours.** Continues Design 275. Analysis and planning preliminary to comprehensive projects involving the development of solutions to problems of production, logistics, and the like. Prerequisite: Any one of Des. 272, 273, 274, 275.
281. **Colloquium. 1 hour.** Continues Design 276. Current problems in design presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: Des. 278.
282. **Industrial Design. 2 hours.** Continues Design 277. An experimental approach to the utilization of functional structures, i.e., for support and suspension in tension and compression. Application of the foregoing principles to functional design. Prerequisite: Any one of Des. 277, 278, 279, 280.
283. **Industrial Design. 3 hours.** Continues Design 278. Prototyping production processes, material investigation. Prerequisite: Any one of Des. 277, 278, 279, 280.
284. **Industrial Design. 4 hours.** Continues Design 279. Systematic two-dimensional and three-dimensional investigation of communication elements as they relate to design and planning for display and exhibition design. Prerequisite: Any one of Des. 277, 278, 279, 280.
285. **Industrial Design. 5 hours.** Continues Design 280. Analysis and planning preliminary to comprehensive projects involving the development of solutions to problems of production, logistics, and the like. Prerequisite: Any one of Des. 277, 278, 279, 280.
286. **Colloquium. 1 hour.** Current problems in design presented by profes-

sionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: Des. 281.

287. **Industrial Design. 2 hours.** Advance design in two-dimensional and three-dimensional presentations, sequential analysis, photo records, charts, diagrams, drawings, and other visual materials. Prerequisite: Any one of Des. 282, 283, 284, 285.
290. **Colloquium. 1 hour.** Continues Design 286. Current problems in design presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: Des. 286.
291. **Industrial Design. 2 hours.** Continues Design 287. Advance design in two-dimensional and three-dimensional presentation, sequential analysis, photo records, charts, diagrams, and other visual materials. Prerequisite: Des. 287.
292. **Industrial Design. 3 hours.** Projects developed from forming concepts. Natural and synthetic materials; heat, chemical, and mechanical processes. Prototyping techniques and material investigation. Prerequisite: Des. 285.
295. **Colloquium. 1 hour.** Continues Design 290. Current problems in design presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: Des. 290.
296. **Industrial Design. 2 hours.** Continues Design 291. Advance design in two-dimensional and three-dimensional presentation, sequential analysis, photo records, charts, diagrams, drawings, and other visual materials. Prerequisite: Des. 291 or 292.
297. **Industrial Design. 3 hours.** Continues Design 292. Projects developed from forming concepts. Natural and synthetic materials; heat, chemical, and mechanical processes. Prototyping techniques and material investigation. Prerequisite: Des. 291 or 292.
330. **Synthesis of the Plastic Arts and Design. 3 hours.** Interrelation of the plastic and graphic arts through experiences with two-dimensional and three-dimensional projects. Prerequisite: Any one of Des. 220 through 227.
332. **Communications Design. 5 hours.** A comprehensive project in an area of social significance, using several mass media. Research, analysis, development, design, coordination, and presentation. Prerequisite: Any one of Des. 220 through 227.
336. **Communications Design. 4 hours.** Continues Design 231. Development of

a significant comprehensive theme applicable to the problems of display, exhibition, stage, museum, exposition, and other areas. Research, planning, and scale-model making. Prerequisite: Any one of Des. 229, 231, 330, 332.

337. **Communications Design. 5 hours.** Continues Design 332. A comprehensive project in an area of social significance, using several mass media. Research, analysis, development, design, coordination, and presentation. Prerequisite: Any one of Des. 229, 231, 330, 332.
341. **Communications Design. 4 hours.** Continues Design 336. Development of a significant comprehensive theme applicable to the problems of display, exhibition, stage, museum, exposition, and other areas. Research, planning, and scale-model making. Prerequisite: Any one of Des. 234, 235, 336, 337.
342. **Communications Design. 5 hours.** Continues Design 337. A comprehensive project in an area of social significance, using several mass media. Research, analysis, development, design, coordination, and presentation. Prerequisite: Any one of Des. 234, 235, 336, 337.
360. **Synthesis of the Plastic Arts and Design. 3 hours.** Interrelation of the plastic and graphic arts through experiences with two-dimensional and three-dimensional projects. Prerequisite: Any one of Des. 254, 255, 256, 257.
361. **Photography-Film. 4 hours.** Elements of photographic communication with lights and multiple projection, using slides, film strips, gelatins, filters, words, and images. Prerequisite: Any one of Des. 254, 255, 256, 257.
362. **Photography-Film. 5 hours.** A significant project in photographic or cinemagraphic communication involving photo animation, photo journalism, portraiture, and editorial, industrial, or architectural photography. Prerequisite: Any one of Des. 254, 255, 256, 257.
366. **Photography-Film. 4 hours.** Continues Design 361. Elements of photographic communication with lights and multiple projection, using slides, film strips, gelatins, filters, words, and images. Prerequisite: Any one of Des. 259, 360, 361, 362.
367. **Photography-Film. 5 hours.** Continues Design 362. A significant project in photographic or cinemagraphic communication, involving photo animation, photo journalism, portraiture, and editorial, industrial, or architectural photography. Prerequisite: Any one of Des. 259, 360, 361, 362.
371. **Photography-Film. 4 hours.** Continues Design 366. Elements of photographic communication with lights and multiple projection, using slides, film strips, gelatins, filters, words, and images. Prerequisite: Any one of Des. 264, 265, 366, 367.
372. **Photography-Film. 5 hours.** Continues Design 367. A significant project

in photographic or cinemagraphic communication involving photo animation, photo journalism, portraiture, and editorial, industrial, or architectural photography. Prerequisite: Any one of Des. 264, 265, 366, 367.

388. **Synthesis of the Plastic Arts and Design. 3 hours.** Interrelation of the plastic and graphic arts through experiences with two-dimensional and three-dimensional projects. Prerequisite: Any of Des. 282, 283, 284, 285.
389. **Industrial Design. 4 hours.** Comprehensive development of systems for mass forming of materials for general and specific goals; economics of production and distribution. Prerequisite: Any one of Des. 282, 283, 284, 285.
390. **Industrial Design. 5 hours.** An advanced comprehensive design, research, and development project involving areas of human environmental requirements. Research, analysis, planning, prototypes, testing, and total presentation. Prerequisite: Any one of Des. 282, 283, 284, 285.
393. **Industrial Design. 4 hours.** Continues Design 389. Comprehensive development of systems for mass forming of materials for general and specific goals; economics of production and distribution. Prerequisite: Any one of Des. 287, 388, 389, 390.
394. **Industrial Design. 5 hours.** Continues Design 390. An advanced comprehensive design, research, and development project involving areas of human environmental requirements. Research, analysis, planning, prototypes, testing, and total presentation. Prerequisite: Any one of Des. 287, 388, 389, 390.
398. **Industrial Design. 4 hours.** Continues Design 393. Comprehensive development of systems for mass forming of materials for general and specific goals; economics of production and distribution. Prerequisite: Any one of Des. 291, 292, 393, 394.
399. **Industrial Design. 5 hours.** Continues Design 394. An advanced comprehensive design, research, and development project involving areas of human environmental requirements. Research, analysis, planning, prototypes, testing, and total presentation. Prerequisite: Any one of Des. 291, 292, 393, 394.

## ECONOMICS (Econ)

Asterisks (\*) indicate general education credit in social sciences.

- \*120. **Principles of Economics I. 4 hours.** The elements of economic analysis: concepts of economy, market organization, price determination and function. Prerequisite: Sophomore standing. **F, W, S**



- \*121. Principles of Economics II. 4 hours.** The elements of economic analysis, continued: determination of the level of economic activity; the effect of monetary and fiscal policies on economic activity levels. Applications to economic policy. Prerequisite: Econ. 120. **F, W, S**
- 320. Macroeconomic Theory. 4 hours.** Principles of national income accounting, determination of aggregate income and employment, the monetary system in relation to income and employment, short-term income fluctuations, long-term income growth. Prerequisite: Econ. 121 and Fin. 340 or Phase II MBA student standing. **F, W, S**
- 321. Microeconomic Theory. 4 hours.** Operation of individual markets; market structure; theory of the firm; theory of production; demand theory; general equilibrium and welfare economics. Prerequisite: Econ. 121 and Fin. 340 or Phase I MBA student standing. **F, W, S**
- 322. Managerial Economics. 4 hours.** The application of economic theory to decision making in the business firm. Demand and cost analysis (including demand forecasts); price policy of the individual firm; capital budgeting; production analysis; uses of operations research methods. Prerequisite: Econ. 321. **F, W, S**
- 323. Business Conditions Analysis. 4 hours.** The application of economic theory to analysis of changes in aggregate income and employment; methods of forecasting changes. Examination of economic models and other analytical tools; their uses in the prediction of aggregate and more refined levels of business activity. Prerequisite: Econ. 320. **F, W, S**
- \*324. Economic History of the United States. 4 hours.** The growth of the American economy from colonial times to the present; special emphasis on the forces and factors contributing to this process. Prerequisite: Econ. 121. **F, S**
- \*325. Economic History of Europe. 4 hours.** Evolution of the economic institutions of Europe, beginning with the origins of capitalism; the development of industry, commerce, transportation, finance, and labor. Prerequisite: Econ. 121. **W**
- \*326. History of Economic Thought. 4 hours.** Survey of the major schools of economic thought; analysis of the historical evolution of the leading ideas of modern economics. Prerequisite: Econ. 121. **F, S**
- \*327. Comparative Economic Systems. 4 hours.** Description and analysis of the normative and positive characteristics of capitalism, fascism, democratic socialism, and communism. Prerequisite: Econ. 121. **F, W**
- \*328. Government Finance. 4 hours.** Government finance at the federal, state, and local levels, including government expenditures, principles of taxation, fiscal policy, government borrowing and the national debt, and inter-governmental fiscal relations. Prerequisite: Econ. 121. **F, W**



- 329. Industrial Organization. 4 hours.** The structure of markets; behavior of firms within the market environment; measures of industrial concentration; economics of scale; mergers and the merger movement; price discrimination and tie-in sales; monopoly and cartel arrangements; resale price maintenance; innovation and technological change. Prerequisite: Econ. 121. **W**
- \*330. Government and Business. 4 hours.** The rationale and the mechanisms of the social control of business; the effects of government action in influencing the behavior of business firms; the procompetitive policy embodied in the Sherman Act and related legislation. Prerequisite: Econ. 121. **F, S**
- \*331. Labor Economics. 4 hours.** Economic problems and issues of trade union organization and wage theory; job security, hours, working conditions, labor legislation, unemployment. Prerequisite: Econ. 121. **F, W, S**
- \*332. Urban Economics. 4 hours.** Survey of economic problems of cities; the nature and function of cities; the demand for, and supply of housing and urban land; implications of location theory for the spatial pattern of cities; the impact of government programs. Prerequisite: Econ. 121. **F, W, S**
- \*333. International Economics. 4 hours.** The balance of payments; fixed, flexible, and multiple exchange rates; the forward exchange market; the international trade multiplier; the transfer problem; capital flows; the law of comparative advantage; the gains from trade; tariffs and subsidies; the factor price equalization theorem; international economic communities. Prerequisite: Econ. 121. **F, W, S**
- \*334. Economic Development. 4 hours.** Basic problems and characteristics of underdeveloped countries; classical, neoclassical, and modern contributions to the theory of development; major proposals for accelerating development; basic approaches to economic development; laissez-faire, interventionist; role and methods of planning; foreign aid; and economic integration. Prerequisite: Econ. 121. **F, W, S**
- 335. Econometrics. 4 hours.** Formulation and testing of stochastic models; special emphasis on economic models, both static and dynamic. Problems of estimation and a number of applications, such as business forecasting, are considered. Prerequisites: Econ. 320, 321, Math. 112, QM 172, or consent of the instructor. **F, S**
- 336. Introduction to Mathematical Economics. 4 hours.** Application of mathematics to theories of consumer and producer behavior, to the determination of prices in markets, and to growth and stability features of macroeconomic models. Prerequisites: Econ. 320, 321, Math. 110 and 112.
- \*398. Independent Study in Economics. 2 to 5 hours.** May be repeated once for credit. Independent study under the direction of a faculty member. Pre-

requisites: 15 hours of 300-level courses in economics and permission of the head of the department. **F, W, S**

- \*399. Special Topics in Economics. 4 hours.** May be repeated once for credit. Intensive consideration of a limited number of problems in a particular field of economics, using more advanced techniques of analysis. Use of professional literature is an important part of the course. Prerequisites: Econ. 320 or 321; an introductory field course, if applicable; and consent of the instructor. **F, W, S**

## **EDUCATION (Ed)**

Note: Classroom observation and/or related field experiences in the public schools are required of all students enrolled in each education course.

- 170. Educational Foundations. 4 hours.** The philosophical, historical, and social forces influencing current issues and practices in American education; their relevance in understanding the role of the teacher. Prerequisites: Psch. 100 and 60 hours of work.
- 210. The Educative Process. 4 hours.** An interdisciplinary study of the bio-social and psychological factors influencing learning processes; the application of behavioral science knowledge to understanding the individual learner in the educative process. Prerequisite: Ed. 170 or the equivalent.
- 221. Children's Literature. 4 hours.** A survey of children's literature from the seventeenth century to the present. Emphasis on the classics and present-day literature; methods of selection; using literature with children.
- 230. Curriculum and Instruction in the Secondary School. 4 hours.** Basic principles of curriculum development, organization of learning experiences, the basic concepts of teaching. The application of the principles prepares the student for responsibilities in curriculum planning and classroom instruction in his fields of specialization. Prerequisite: Ed. 210.
- 235. Curriculum and Instruction in the Elementary School. 4 hours.** Active investigation of the general dynamics of curriculum development at the elementary school level; special emphasis on research and synthesis in developing and coordinating the classroom experience. Prerequisites: Ed. 170 and 210.
- 245. Creative Teaching in Elementary Schools. 4 hours.** An exploration of the principles and processes of creativity with emphasis on implications and applications for creative teaching. A creative approach to curriculum planning, content of curriculum areas, teaching, and learning will be stressed. Prerequisites: Ed. 221 and 235, Art 204, Mus. 250, and PEW 220 and 221.

250. **Educational Evaluation. 4 hours.** Theories and methods of evaluation: the assessment of individuals, groups, and educational institutions in the attainment of educational objectives. Prerequisite: Ed. 230 or 235.
261. **Teaching Reading in Elementary School. 4 hours.** The nature of the reading process; relationship of reading to child development, and its place in the total school program. Prerequisite: Ed. 230 or 235.
265. **Teaching of Reading in Secondary Schools. 4 hours.** The nature of the reading process and the developmental needs of adolescents in order to help them to perceive the importance of reading instructions at junior and senior school levels. Prerequisites: Ed. 170, 210, 230.
270. **Educational Practice with Seminar. 12 hours.** The professional quarter of practice teaching, including a weekly seminar, to meet certification requirements for teaching in the elementary and secondary school. Prerequisites: Ed. 250, admission to advance standing, and recommendation of the department of specialization.
280. **Survey of Characteristics and Education of Exceptional Children. 4 hours.** Seminar and observations considering the physical, mental, emotional, and social characteristics of exceptional children (blind, deaf, mentally retarded, learning disabled, speech impaired, orthopedically handicapped, gifted). Prerequisites: Soc. 100, Ed. 210, and consent of the instructor.
281. **Psycho-Educational Aspects of Exceptional Children I. 4 hours.** Examination of the social and emotional adjustment of teachers and children in the special education classroom. Discussion and observation of personality, feelings of exceptionality, adjustment mechanisms, classroom therapy, and behavior of children and teachers. Laboratory practice is required. Prerequisites: Ed. 280 and consent of the instructor.
282. **Psycho-Educational Aspects of Exceptional Children II. 4 hours.** Investigation and examination of the personal professional skills necessary for providing special education for exceptional children; emphasis on the skills necessary for working with emotionally disturbed, learning disabled, and mentally retarded children. Laboratory practice is required. Prerequisites: Ed. 281 and consent of the instructor.
290. **Characteristics of Children with Special Learning Disabilities. 5 hours.** Clinic-workshop investigation of the significant psychological, educational, environmental, and medical correlates of special learning disabilities. Definitions, terminology, prevalence, characteristics, theories, and organizational structures. Prerequisite: Ed. 282.
291. **Methods of Teaching Children with Special Learning Disabilities. 5 hours.** Clinic-workshop investigation of diagnostic-remedial methods and their implementation in the special program for learning disabled children.

Analysis and synthesis of multidisciplinary research in the development and practice of a scientific pedagogy for special learning disabilities. Prerequisite: Ed. 290.

292. **Special Education Practicum—Learning Disability.** 12 hours. Full-time practice teaching in a special education program that involves children who have learning disabilities; a weekly seminar focuses on the problems that occur while working with these students. Prerequisite: Ed. 291.
293. **Special Education Practicum—Mental Retardation.** 12 hours. Full-time practice teaching in a special education program that involves children who are mentally retarded; a weekly seminar focuses on the problems that occur while working with these students. Prerequisite: Ed. 295.
294. **Characteristics of the Mentally Retarded Child.** 5 hours. Definitions, characteristics, classifications, etiology and syndromes, diagnosis and theoretical approaches, rehabilitation procedures, and educational implications. Laboratory practice is required. Prerequisites: Ed. 282 and consent of the instructor.
295. **Methods of Teaching the Educable Mentally Handicapped Child.** 5 hours. Curriculum development; diagnostic procedures; educational materials, methods, and techniques. Clinical practice in administering, interpreting, and evaluating diagnostic techniques is required. Prerequisites: Ed. 294 and consent of the instructor.
296. **Special Education Practicum—Emotionally Disturbed.** 12 hours. Full-time practice teaching in a special education program that involves children who are emotionally disturbed; a weekly seminar focuses on the problems that occur while working with these students. Prerequisite: Ed. 298.
297. **Psychology of the Maladjusted Child.** 5 hours. A clinical course combining field experiences, seminar activities, and lectures. The aspects of educational and psychological diagnosis of emotionally disturbed children served at the elementary school level; translating diagnostic materials into educational goals. Prerequisite: Ed. 282.
298. **Classroom Management and Remedial Interventions.** 5 hours. A clinical course utilizing field experiences, seminars, and lecture formats. Task and maintenance functions in the classroom, including methods, techniques, and materials to be used in teaching emotionally disturbed children. Individual and group management problems in the classroom. Prerequisite: Ed. 297.
299. **Independent Study Program.** 1 to 4 hours. For undergraduate students who wish to do independent study on specific educational processes, or to do independent study on projects related to education, or to carry on extensive reading assignments. A written proposal must be presented to the faculty. **F, W, S**



**ENERGY ENGINEERING (EnrE)**

100. **Thermodynamics I.** 4 hours. Energy and the first law of thermodynamics. Properties and state. Entropy and the second law of thermodynamics. Prerequisite: MatE. 101.
200. **Thermodynamics II.** 4 hours. Engineering applications of the first and second laws. Equation of state. Multicomponent systems. Special topics. Prerequisite: EnrE. 100.
201. **Thermodynamics.** 4 hours. Macroscopic thermodynamics with some treatment of microscopic principles. First and second laws of thermodynamics and their applications to engineering systems of current interest. Equations of state. Prerequisite: Concurrent registration in Math. 132.
202. **Intermediate Thermodynamics.** 4 hours. Thermodynamics of state. Vapor and gas power cycles; refrigeration cycles. Prerequisite: EnrE. 201.
211. **Fluid Mechanics.** 4 hours. Fundamental laws governing fluid flow with applications to internal and external flow problems, including the effects of compressibility and viscosity. Prerequisites: EnrE. 201; credit or registration in Math. 220 or the equivalent.
212. **Potential Flow.** 4 hours. Basic irrotational flows, their combination and transformation used in modeling flows with solid surfaces. Elementary, two-dimensional airfoil theory. Prerequisite: EnrE. 211.
213. **Compressible Flow.** 4 hours. Compressible, isentropic, one-dimensional flow. Waves and characteristics in supersonic flows. Prerequisite: EnrE. 211.
214. **Viscous Fluid Mechanics.** 4 hours. Governing equations, energy dissipation, exact and approximate solutions, boundary layer theory, turbulent flows. Prerequisite: EnrE. 211.
215. **Engineering Hydrology.** 4 hours. Basic principles, methods of analysis, and applications for engineering planning and design. Major topics include the various phases of the hydrologic cycle, data collection and interpretation, water resources systems, determination of flow capacity for hydraulic structures. Statistical analysis. Prerequisite: EnrE. 211.
216. **Oceanography.** 4 hours. A study of the marine environment, both chemical and physical. Waves, currents, and mixing processes. Marine organisms. Prerequisite: EnrE. 214.
217. **Introduction to Meteorology.** 4 hours. An examination of the factors which control our climatic environment. Study of the atmosphere at rest and in



motion. Wind structure and atmosphere turbulence. Aspects of heat transfer, diffusion, and evaporation as related to meteorological phenomena. Study of the overall system. Prerequisites: EnrE. 212 and 214.

221. **Heat Transfer. 4 hours.** Elementary treatment of the fundamental laws governing engineering heat transfer: conduction, convection, and radiation, with emphasis to be placed on physical understanding rather than empiricism; elementary application of the principles. Prerequisite: EnrE. 211.
231. **Chemical Engineering Thermodynamics I. 4 hours.** Review of first and second laws of thermodynamics with subsequent applications to chemical systems. Free energy, availability, equilibrium conditions, and applications to chemical processes. Equilibrium constant and chemical potential for ideal gas reactions and heterogeneous systems. Phase change. Prerequisite: EnrE. 201.
232. **Chemical Process Analysis. 2 hours.** Material and energy balances applied to chemical systems. Thermochemical calculations of heats of reaction and combustion. Vapor pressure, solubility, and partial pressure. Calculations of chemical and metallurgical process systems. Prerequisites: EnrE. 201, Chem. 116.
234. **Transport Processes. 4 hours.** Transport processes of chemical engineering. Fluid systems, non-Newtonian fluids. Flow through porous media. Filtration. Centrifuging. Heat transfer with and without change of phase. Evaporation. Prerequisite: EnrE. 211.
235. **Chemical Engineering Laboratory I. 1 hour.** A 3-hour laboratory devoted to the study of mass, heat, and momentum transfer operations associated with chemical process equipment. Supplements EnrE. 234. Prerequisites: EnrE. 232, credit or registration in EnrE. 234.
241. **Experimental Methods in Solid and Fluid Mechanics. 4 hours.** Same as MatE. 241. Introduction to the theory and practice of experimental methods, measurement techniques in solids and fluids, analysis of errors. Concurrent laboratory experiments and reports. Prerequisites: EnrE. 211, MatE. 102 and 103.
281. **Design. 4 hours.** Independent study course. The design approach involving modeling, analysis, and synthesis of basic fundamentals in engineering problems. Prerequisite: Senior standing.
282. **Design. 4 hours.** Independent study course. The design approach to engineering projects requiring teamwork. Prerequisite: EnrE. 281.
285. **Diffusional Operations. 4 hours.** Applications of principles of stage-wise methods to heat and mass transfer operations. Studies of types of equipment as illustrated by fixed, continuous flow, and fluidized beds. Chemical engineering laboratory. Prerequisite: EnrE. 231.

- 304. Transport Phenomena. 4 hours.** Introduction to continuum theory of momentum, energy and mass transfer. Transport of scalar and vector quantities. Reynolds' Transport theorem. General differential equations of transport phenomena. Momentum shell balances. Energy transport. Diffusion. Couple operations; free convection, simultaneous heat and mass transfer, etc. Prerequisites: EnrE. 201 and 211, or consent of the instructor.
- 305. Statistical Thermodynamics. 4 hours.** Statistical formulation; partition functions, including quantum effect. Application to macroscopic systems; systems of interacting particles. Emphasis on engineering applications. Prerequisites: EnrE. 201; Math. 220 or the equivalent.
- 307. Kinetic Theory of Gases and Transport Phenomena. 4 hours.** Basic concepts of kinetic theory of gases. Equations of state and their molecular interpretation. Elementary classical statistics, molecular collisions. Application of the kinetic theory to viscosity, heat conduction, and diffusion. Prerequisite: Completion of the core program.
- 310. Continuum Fluid Mechanics. 4 hours.** Development of the conservation equations for a Newtonian fluid: continuity, Navier-Stokes, and energy equations. Some exact and approximate solutions of highly viscous, viscous, and inviscid flow problems. Prerequisite: Math. 220 or the equivalent.
- 311. Free Surface Flow. 4 hours.** Application of the fundamentals of fluid mechanics to fluids with a free surface. Wave phenomena, channel flow, and free streamlines. Prerequisites: EnrE. 212 and 214.
- 312. Porous Media. 4 hours.** Mechanics of fluid flow in porous media. Steady and unsteady flow in isotropic and anisotropic media. Multiphase and multilayered systems. Prerequisites: EnrE. 212 and 215.
- 313. Aerodynamics of Flight. 4 hours.** Lift and drag, both subsonic and supersonic. Perturbation problems. Airfoil and slender body theories. Three-dimensional wings. Prerequisites: EnrE. 212 and 213, or consent of the instructor.
- 314. Propulsion. 4 hours.** Thermodynamics and fluid mechanics of airbreathing engines. Performance of rockets: chemical, nuclear, and electrical. Prerequisites: EnrE. 213.
- 316. Introduction to Continuum Mechanics. 4 hours.** Same as Materials Engineering 316. Cartesian tensors, kinematics of fluids and solids, conservative equations, constitutive equations for simple materials. Examples. Prerequisites: EnrE. 211 or Mate. 204, and Math. 220.
- 321. Intermediate Heat Transfer. 4 hours.** Topics in conduction, convection, and radiation heat transfer, with special emphasis on the exact solutions

of the problems. Two-phase flow; heat exchangers; mass transfer cooling; rarefied gas analysis. Prerequisite: EnrE. 221, Math. 220 or consent of the instructor.

331. **Chemical Engineering Thermodynamics II.** 3 hours. Clausius-Clapeyron equation for a pure component. Development and application of phase rule to one component vapor-liquid-solid system. Extension to multicomponent systems. Consideration of retrograde condensation, azeotropic mixtures, critical properties of pure systems. Third law of thermodynamics and applications. Fugacity and activity of solutions and gases. Prerequisite: EnrE. 231.
341. **Experimental Methods and Techniques.** 4 hours. Purpose and design of experiments; statistical analysis of errors; wind tunnel, shock tube, high vacuum and chemical reactor techniques; theory of mechanical, thermal, optical, and chemical measurements. Prerequisite: Consent of the instructor.
351. **Electromechanical Energy Conversion I.** 4 hours. Conservation of energy, electromagnetic forces, applications to linear and nonlinear lumped-parameter systems, stability. Principles of rotating machines and equations of motion. Applications to synchronous, induction, d-c, and novel machines. Prerequisites: InfE. 221 and credit or registration in InfE. 311, or consent of the instructor.
352. **Electromechanical Energy Conversion II.** 4 hours. Continues Energy Engineering 351. Completion of rotating machines. Interaction of electromagnetic fields with stationary and moving continuous media. Maxwell stress tensor and waves and instabilities. Applications to energy conversion with emphasis on fluids (magnetohydrodynamics). Prerequisites: EnrE. 211, 351, InfE. 320.
353. **Direct Energy Conversion.** 4 hours. Novel methods of converting heat directly to electrical energy. Consideration of magnetohydrodynamics, thermoelectrics, thermionics, and fuel cells. Prerequisites: EnrE. 202 and 352 or consent of the instructor.
356. **Introduction to Plasmas.** 4 hours. Motion of particles in electric and magnetic fields. Kinetic theory and elementary processes. Boltzmann equation, macroscopic equations, transport coefficients. Creation of ionized gas. The magnetohydrodynamic approximation. Waves and instabilities. Prerequisite: InfE. 221 or the equivalent.
386. **Chemical Reaction Engineering.** 4 hours. Principles of rate processes; application to chemical systems. Development of reactor unit concept. Interpretation of reactor data. Product distribution in multiple reactions; selection of rate controlling step. Application to design. Chemical engineering laboratory experiments. Prerequisite: Chem. 342 or the equivalent.

391. **Seminar. 1 to 4 hours.** May be repeated for additional credit. Topics to be arranged. Prerequisite: Consent of the instructor.
392. **Undergraduate Research. 2 to 4 hours.** Research under close\* supervision of a faculty member. Prerequisites: Senior standing and consent of the instructor.
393. **Special Problems. 2 to 4 hours.** Special problems or reading by special arrangement with the faculty. Prerequisites: Senior standing and consent of the instructor.

## ENGLISH (Engl)

Asterisks (\*) indicate general education credit in humanities.

- \*101. **Introduction to Poetry. 4 hours.** Understanding poetry by reading and discussing representative poems. **W, S, Su, F**
- \*102. **Introduction to Drama. 4 hours.** Understanding drama by reading and discussing representative plays. Selections from Greek, Elizabethan, modern English, Continental, and American drama. **W, S, Su, F**
- \*103. **Introduction to Fiction. 4 hours.** Understanding fiction by reading and discussing representative American, British, and Continental fiction of several periods and types. **W, S, Su, F**
111. **Introduction to Library Science for Teachers of High School English. 4 hours.** Examination of the principles of library organization, book selection, and research and bibliography for grades seven through twelve. Individual conferences on assigned papers are required. **W, S, F**
131. **Introduction to Shakespeare. 4 hours.** Introductory survey of Shakespeare's plays and poems. Prerequisite: Sophomore standing or exemption from Rhet. 102. **F**
- \*150. **A Survey of English Literature I. 4 hours.** Note: English 150, 151, and 152 are required of all English majors. A chronological survey of the major works of English literature from about 760 to 1660. Prerequisite: Sophomore standing or exemption from Rhet. 102 or James Scholar status. **W, S, Su, F**
- \*151. **A Survey of English Literature II. 4 hours.** A chronological survey of the major works of English literature from 1660 to 1832. Prerequisites: Sophomore standing or exemption from Rhet. 102 or James Scholar status and Engl. 150. **W, S, Su, F**

- \*152. A Survey of English Literature III. 4 hours.** A chronological survey of the major works of English literature from 1832 to the present. Prerequisites: Sophomore standing or exemption from Rhet. 102 or James Scholar status and Engl. 151. **W, S, Su, F**
- \*190. Sophomore Honors in English Literature I. 4 hours.** Chaucer through Milton. The first course in a three-quarter sequence designed to acquaint students with major works of English literature in chronological order. Prerequisite: Admissions is by recommendation of the department only. **F**
- \*191. Sophomore Honors in English Literature II. 4 hours.** Dryden through Keats. The second course in the three-quarter sequence. Prerequisite: Admission is by recommendation of the department only. **W**
- \*192. Sophomore Honors in English Literature III. 4 hours.** Tennyson through T. S. Eliot. The third course in the three-quarter sequence. Prerequisite: Admission is by recommendation of the department only. **S**
- 198. Freshman Honors Seminar. 4 hours.** Admission is by invitation after screening by University Honors Office, followed by further testing by the Department. May be repeated for a maximum of 12 hours. Introduction to literature for selected freshmen. The subject of the seminar is changed every quarter. Students who complete three English 198 seminars may earn exemption from Rhetoric 102. Prerequisites: Freshman standing and admission to the honors program in English. **F**
- Note: 200-level and 300-level courses are restricted to juniors, seniors, and to those lower-division students who have the consent of the instructor.
- 210. The Teaching of English. 4 hours.** For prospective teachers of English in secondary schools. Emphasis on theory and practice in the teaching of English. Prerequisite: Senior standing or consent of the instructor. **W, S, Su, F**
- 211. Mythology of Greece and Rome. 4 hours.** Same as Classics 211. Myth and religion, history, folk tales, and literature. Prerequisite; Junior standing or consent of the instructor.
- 225. English Literature of the Early Renaissance. 4 hours.** Sidney, Marlowe, Jonson, Spenser, and others. Prerequisite: Junior standing or consent of the instructor. **S, F**
- 226. English Literature of the Late Renaissance and Interregnum. 4 hours.** Donne, Herrick, Bacon, Burton, Marvell, Hall, Herbert, Milton, and others. Prerequisite: Junior standing or consent of the instructor. **W, Su**



228. **English Prose of the Early Seventeenth Century from 1603 to 1660. 4 hours.** Representative selections, with emphasis on the works of Bacon, Browne, Donne, Milton. Prerequisite: Junior standing or consent of the instructor. **W**
231. **Shakespeare. 4 hours.** The young playwright's uses of older and current modes of drama, from Roman comedy and the history play through revenge tragedy. Prerequisite: Junior standing or consent of the instructor. **S, F**
232. **Shakespeare. 4 hours.** The mature playwright's handling of great tragic themes and his uses of tragicomedy. Prerequisite: Junior standing or consent of the instructor. **W, Su**
234. **Techniques of Literary Criticism and Scholarship. 4 hours.** Methods and approaches to the analysis and criticism of literary texts and techniques of scholarship. Prerequisites: Junior standing, English major, and either Engl. 152, or 190, 191, and 192.
243. **English Prose and Poetry of the Romantic Movement I. 4 hours.** Introductory study of the pre-Romantics, with emphasis on Blake and Burns, followed by a close study of the early Romantics, with emphasis on Wordsworth and Coleridge. Prerequisite: Junior standing or consent of the instructor. **S, F**
244. **English Prose and Poetry of the Romantic Movement II. 4 hours.** Poetry and fiction of Scott; poetry, criticism, and letters of Byron, Shelley, and Keats; prose of Landor, Hazlitt, Hunt, and De Quincey. Prerequisite: Junior standing or consent of the instructor.
246. **English Literature from 1660 to 1700. 4 hours.** Reading in the representative works of the major authors, and review of the developing genres, of the late seventeenth century—exclusive of the novel. Prerequisite: Junior standing or consent of the instructor.
247. **English Literature from 1700 to 1730. 4 hours.** Readings in the representative works of the major authors, and review of the developing genres, of the early eighteenth century, exclusive of the novel. Prerequisite: Junior standing or consent of the instructor.
248. **English Literature from 1730 to 1798. 4 hours.** The major authors of the middle and late eighteenth century and the intellectual and historical background, with emphasis on the novelists, the Johnson circle, and the pre-Romantics. Prerequisite: Junior standing or consent of the instructor. **W, Su**
249. **Greek Tragic Drama in Translation. 4 hours.** Same as Classics 249. Knowledge of Greek is not required. The Plays of Aeschylus, Sophocles, Euripides. Prerequisite: Junior standing or consent of the instructor. **F**

250. **The Eighteenth Century Novel.** 4 hours. Brief survey of antecedents; discussion of the major novelists (Defoe, Richardson, Fielding, Smollett, and Sterne) and of the development of new forms and kinds, including the novel of sensibility, the novel of manners, the Gothic novel or tale of terror and other subtypes. Prerequisite: Junior standing or consent of the instructor. **W**
253. **The English Bible I: The Old Testament.** 4 hours. Same as Humanities 253. An historical and analytical study of the Old Testament portion of the English Bible, concentrating on the King James version and taking note of more recent revisions of that version. Prerequisite: Junior standing or consent of the instructor.
254. **The English Bible II: The Apocrypha and the New Testament.** 4 hours. Same as Humanities 254. An historical and analytical study of the Apocrypha and New Testament portions of the English Bible, concentrating on the King James version and taking note of more recent revisions of that version. Prerequisite: Junior standing or consent of the instructor.
255. **Survey of American Literature I.** 4 hours. From 1607 to the Civil War. American literature and its cultural background from the beginnings through Poe. Prerequisite: Junior standing or consent of the instructor. **W, S, Su, F**
256. **Survey of American Literature II.** 4 hours. American literature and its cultural background from the Transcendentalists to 1912. Prerequisites: Junior standing or consent of the instructor and Engl. 255. **W, S, Su, F**
257. **Survey of American Literature III.** 4 hours. Major figures in American literature from 1912 to the present. Prerequisites: Junior standing or consent of the instructor and Engl. 256. **W, S, Su, F**
259. **The Victorian Novel.** 4 hours. A critical study of selected novels of the Victorian era, including works by Dickens, Thackeray, Trollope, George Eliot, Meredith, Hardy, and others. Prerequisite: Junior standing or consent of the instructor.
263. **Victorian Poetry.** 4 hours. Significant English poets of the Victorian period, from Tennyson to Hardy. Prerequisite: Junior standing or consent of the instructor.
264. **Victorian Prose.** 4 hours. Nonfictional prose of the Victorian period, including Carlyle, Mill, Newman, Arnold, Ruskin, Pater, and others. Prerequisite: Junior standing or consent of the instructor.
281. **Modern Drama I.** 4 hours. The major playwrights and the trends in drama from 1870 to about 1920; particular attention to Ibsen, Strindberg, Shaw, Chekhov. Prerequisite: Junior standing or consent of the instructor. **W, F**

282. **Modern Drama II. 4 hours.** Major trends and dramatists from the 1920's to the present, including Pirandello, Brecht, O'Neill, Lorca, O'Casey, Giraudoux, Beckett, and others. Prerequisite: Junior standing or consent of the instructor.
283. **English Literature in the Twentieth Century I. 4 hours.** English literature from the 1890's to about 1930. Prerequisite: Junior standing or consent of the instructor. **S, F**
284. **English Literature in the Twentieth Century II. 4 hours.** English literature from about 1930 to the present. Prerequisite: Junior standing or consent of the instructor. **W, Su**
285. **Modern Irish Literature—Fiction. 4 hours.** Major writers from the period of the Irish Literary Revival to the present (1880-1960): James Joyce, George Moore, James Stephens, Frank O'Connor, Samuel Beckett, and others. Prerequisite: Junior standing or consent of the instructor.
286. **Modern Irish Literature—Drama and Poetry. 4 hours.** Major playwrights and poets from the Irish Literary Revival to the present (1880-1960): W. B. Yeats, George Russell (AE), J. M. Synge, Lady Gregory, James Stephens, Sean O'Casey, Samuel Beckett, Austin Clarke, and others. Prerequisite: Junior standing or consent of the instructor.
287. **Forms of Modern Fiction. 4 hours.** Same as Humanities 287. Major trends in the development of modern fiction from Flaubert to Faulkner. Prerequisite: Junior standing or consent of the instructor.
288. **The Twentieth Century American Novel to 1945. 4 hours.** Historical and critical study of the development of the American novel from Dreiser to the end of World War II. Close reading of several representative novels. Prerequisite: Junior standing or consent of the instructor. **W, S, Su, F**
289. **Development of Modern Poetry. 4 hours.** Hardy, Yeats, Auden, Dylan Thomas, Frost, Stevens, Eliot, Cummings, and others. Prerequisites: Junior standing and 8 hours of English literature or consent of the instructor. **S, F**
290. **Modern British Fiction. 4 hours.** A study of representative works of fiction, both short fiction and novels, by important modern English writers from Conrad to the present. Prerequisite: Junior standing or consent of the instructor. **W, F**
291. **The American Novel Since World War II. 4 hours.** Historical and critical study of the development of the American novel from 1945 to the present. Close reading of several representative texts. Prerequisite: Junior standing or consent of the instructor.

292. **Contemporary Poetry. 4 hours.** The significant tendencies and key figures in American and British poetry since World War II. Recent writers are examined against the larger background of modernist literature. Prerequisite: Junior standing or consent of the instructor.
295. **Modern English Grammar. 4 hours.** Same as Linguistics 295. Provides study in definition and meaning; use of dictionaries; grammars; survey of syntax. Prerequisite: Junior standing or consent of the instructor.
298. **Senior Honors Seminar. 4 hours.** May be repeated for a maximum of 12 hours. Close study of the works of a particular author or group of authors, of a literary movement or idea, or similar material. The subject of the seminar is changed each quarter. Prerequisites: Senior standing and admission to the honors program in English. **W, S, F**
299. **Independent Study. 1 to 4 hours.** Admission to this course is only on advice of and initiated by the English Department. Individual studies under the direction of an assigned faculty member. Nature of the work is determined by the tutor on the basis of the student's particular needs and interests. Open only to English majors. Prerequisite: Senior standing. **W, S, Su, F**
301. **Introduction to the English Language. 4 hours.** English as a language. The basic concepts of general descriptive and comparative linguistics are used to examine the relationship of English to other languages, its history, and its present structure. Prerequisite: Junior standing or consent of the instructor. **W, S, Su, F**
302. **Tennyson and Browning. 4 hours.** Close study of the lyric poetry and the dramatic monologues of Tennyson and Browning; briefer examination of Tennyson's Arthurian idylls and of the plays of both. Prerequisite: Junior standing or consent of the instructor. **S**
303. **Carlyle and Mill. 4 hours.** Major works. Prerequisite: Junior standing or consent of the instructor. **S**
305. **Newman and Arnold. 4 hours.** The prose of one early and one mid-Victorian writer; their contributions to nineteenth century religious and educational theories. Arnold's literary and social criticism. The rhetoric of both; brief reference to the poems and letters of each that most closely parallel ideas and moods in their prose. Prerequisite: Junior standing or consent of the instructor. **W, F**
306. **Dickens and Thackeray. 4 hours.** Close study of the major writings of the two representative Victorian novelists. Prerequisite: Junior standing or consent of the instructor. **W, Su**

307. **Yeats and Eliot. 4 hours.** Detailed study of the two most influential poets in English of the twentieth century. Study of specific texts; some emphasis on the intellectual and spiritual attitudes represented by each. Prerequisite: Junior standing or consent of the instructor. **F**
308. **Conrad and Lawrence. 4 hours.** Studies in the short fiction and novels of two important modern British writers; examinations of their contrasting views of the purpose of fiction. Prerequisite: A minimum of 12 hours in English.
310. **American Puritanism. 4 hours.** Intensive study of the writings of the American Puritans from William Bradford to Jonathan Edwards. Major aspects of Puritan life and thought. Prerequisite: A minimum of 12 hours in English. **S**
311. **Chaucer. 4 hours.** Readings in the major works. Prerequisite: Junior standing or consent of the instructor. **W, S, F**
312. **Introduction to Old English. 4 hours.** Elements of Old English grammar and the reading of graded prose selections. Prerequisite: Junior standing or consent of the instructor. **S, F**
313. **Old English Poetry and Prose. 4 hours.** Heroic, elegiac, and religious poetry of England to 1200, exclusive of *Beowulf*; representative prose. Prerequisite: Engl. 312. **W**
314. **Beowulf. 4 hours.** Detailed explication of the poem. Prerequisite: Engl. 313. **S**
315. **Introduction to Descriptive Linguistics. 4 hours.** Introduction to theories of the syntactic, morphological and phonological analysis and description of language. Prerequisite: Junior standing or consent of the instructor. **S, Su, F**
316. **American Drama. 4 hours.** Major dramatic writings in American literature. Prerequisite: Junior standing or consent of the instructor. **W, S, Su, F**
317. **The Writing of Poetry. 4 hours.** Limited to 15 students. May be repeated for a total of 12 hours. The practice of the writing of poetry, aided by intensive study of examples. Prerequisite: 12 hours of English literature or consent of the instructor. **W, S, Su, F**
318. **The Aesthetic Movement from 1850 to 1900. 4 hours.** Major figures and ideas behind the Pre-Raphaelite Brotherhood and the Aesthetic Movement in the last half of the nineteenth century in England. Prerequisite: Junior standing or consent of the instructor.
319. **Introduction to Middle English. 4 hours.** A linguistic examination of



Middle English and its dialects. Prerequisite: Junior standing or consent of the instructor.

321. **Medieval Literature I. 4 hours.** Selected works in Middle English and Continental medieval writings in English translation. Prerequisite: Junior standing or consent of the instructor. **S**
322. **Medieval Literature II. 4 hours.** Continues English 321. Prerequisite: A minimum of 12 hours in English.
323. **Wordsworth and Coleridge. 4 hours.** A close examination of the major works, both poetry and prose. Prerequisites: Engl. 243 and 244 or consent of the instructor. **W**
324. **Byron, Shelley and Keats. 4 hours.** The major figures of the second generation of Romantics. Prerequisite: Junior standing or consent of the instructor. **F**
325. **The Writing of Fiction. 4 hours.** Limited to 15 students. May be repeated for a maximum of 12 hours. The practice of the writing of fiction, aided by intensive study of examples. Prerequisites: Junior standing and 8 hours of English literature or consent of the instructor.
331. **The Important Minor Plays and the Poems of Shakespeare. 4 hours.** Plays, poems, and sonnets. Prerequisite: Engl. 231 or 232 or consent of the instructor. **W, F**
332. **The Poetry of Edmund Spenser. 4 hours.** An introduction to *The Faerie Queen* and *The Shepheardes Calendar*, with some attention to the minor verse and its place in the English Renaissance. Prerequisite: A minimum of 12 hours in English.
334. **Literary Criticism, Theory and Practice. 4 hours.** Survey of literary criticism, focusing on major critics from Plato to Arnold. Prerequisite: Junior standing or consent of the instructor. **W, S, Su, F**
335. **Modern Literary Criticism. 4 hours.** Survey of modern literary criticism from Matthew Arnold to the present. Prerequisites: Junior standing or consent of the instructor, and Engl. 334. **W, S, Su, F**
337. **Exercises in Literary Criticism: Poetry. 4 hours.** Advanced course in practical criticism of poetry in English. Prerequisites: Junior standing and Engl. 335 or the equivalent, or consent of the instructor. **W, S, F**
338. **Tragedy. 4 hours.** A formal and theoretic inquiry into tragedy: its origins, evolution, and significance, based on selected masterworks of various periods. Prerequisite: Junior standing or consent of the instructor. **F**

339. **Comedy. 4 hours.** History and theory of comic drama. Prerequisite: Junior standing or consent of the instructor.
340. **English and American Satire. 4 hours.** Selected writings. Prerequisite: A minimum of 12 hours in English.
341. **Dryden. 4 hours.** Individual conferences on assigned papers are required. Poems, plays, and literary criticism; emphasis on the interaction of these genres in Dryden's development. Prerequisite: Junior standing or consent of the instructor. **W, F**
342. **The Poetry of Milton. 4 hours.** Origins, forms, and artistic and ethical values; Milton's place in English literary history. Prerequisite: A minimum of 12 hours in English. **S**
345. **The Metaphysical Poets. 4 hours.** Class reading and discussion of the poetry of Donne, Herbert, Vaughan, Crashaw. Special emphasis on the poetry of Donne. Prerequisite: Junior standing or consent of the instructor. **W**
347. **Restoration Drama. 4 hours.** Major dramatic works after the reopening of the public theaters in 1660; development from aristocratic Baroque tragedy and comedy to the beginnings of bourgeois sentimental drama. Dryden, Etherege, Wycherley, Congreve, Vanbrugh, Farquhar, Otway, Cibber, and others. Prerequisite: Junior standing or consent of the instructor. **S, F**
348. **Swift. 4 hours.** A detailed study of the works of Jonathan Swift in the light of the intellectual and aesthetic currents of the period. Prerequisite: A minimum of 12 hours in English. **S**
349. **Johnson and Boswell. 4 hours.** The principal writings. Prerequisite: Junior standing or consent of the instructor.
350. **The American Transcendentalists. 4 hours.** The Transcendentalist circle in and about Concord from 1830 to 1860; Emerson and Thoreau, Alcott, Brownson, Fuller, Ripley, Parker, Channing, and others. Prerequisite: Engl. 255 or Hist. 356 or 357. **F**
351. **English Prose of the Eighteenth Century. 4 hours.** A survey of eighteenth century prose; emphasis on the development of prose styles and their relation to modes of thought in the century. Prerequisite: A minimum of 12 hours in English.
352. **Pope. 4 hours.** Detailed study of the work of Alexander Pope in the light of the intellectual and aesthetic currents of the period. Prerequisite: Junior standing or consent of the instructor.

353. **Eighteenth Century Drama.** 4 hours. Major dramatic works and trends. Steele, Addison, Rowe, Gay, Lillo, Garrick, Cumberland, Goldsmith, Sheridan, and others will be studied. Prerequisite: Junior standing or consent of the instructor.
355. **American Fiction from 1800 to 1860.** 4 hours. Intensive study of the background and development of traditions and themes. Prerequisite: Junior standing or consent of the instructor. S
357. **Studies in the Short Story.** 4 hours. The short story as a literary form; close readings of selected short stories. Prerequisite: Junior standing or consent of the instructor. S, Su, F
364. **Readings in the Lyric I: European.** 4 hours. Selections from Sappho, Catullus, Petrarch, Villon, San Juan de la Cruz, Goethe, Leopardi, Baudelaire. Students are expected to have a reading knowledge of at least one of the foreign languages involved. Prerequisite: Junior standing or consent of the instructor. F
365. **Readings in the Lyric II: English.** 4 hours. Selected lyrics from the thirteenth through the nineteenth centuries. Prerequisite: A minimum of 12 hours in English.
366. **Readings in the Lyric III: Twentieth Century.** 4 hours. Selections from Yeats, Valery, Rilke, Frost, Montale, Garcia Lorca, Auden. Students are expected to have a reading knowledge of at least one of the foreign languages involved. Prerequisite: Junior standing or consent of the instructor.
375. **Henry James and the Technique of Fiction.** 4 hours. Development of Henry James as a novelist. Prerequisite: A minimum of 12 hours in English. S
376. **W. D. Howells: Realism in Fiction and Criticism.** 4 hours. The career of William Dean Howells as journalist, novelist, editor, and critic; his influences on the development of realism in late nineteenth and early twentieth century American literature. Prerequisite: Junior standing or consent of the instructor. W
377. **Naturalism in the American Novel: Dreiser, Crane, Norris, Lewis, and Others.** 4 hours. The development of the naturalistic novel; special emphasis on Dreiser and his followers. Prerequisite: Junior standing or consent of the instructor.
380. **The Rise of Realism.** 4 hours. The rise of realism in American fiction from 1850 to 1900: Old Southwest Humor, local color, Twain, Howells, Crane, the early naturalists, and others. Prerequisite: Engl. 256. W

382. **The Plays of Bernard Shaw.** 4 hours. A critical, social, and philosophical inquiry. Prerequisite: Junior standing or consent of the instructor. **F**
385. **Faulkner and Hemingway.** 4 hours. Studies in the short stories and novels of the two writers; examination of their literary theories. Prerequisite: Junior standing or consent of the instructor. **W**
386. **Hawthorne and Melville.** 4 hours. Two major writers of the nineteenth century; detailed analysis of one major novel of each. Prerequisite: Engl. 255 or consent of the instructor. **S**
387. **The Structure of English.** 4 hours. Traditional and structuralist grammar descriptions; introduction to transformational grammatical studies; detailed survey of a transformational syntax of English; brief introduction to generative phonology and morphophonemic analysis of English, especially stress. Prerequisite: Engl. 301. **S, F**
388. **Southern Fiction.** 4 hours. Major works. Prerequisite: Junior standing or consent of the instructor. **S**
389. **Walt Whitman and Emily Dickinson.** 4 hours. The poetry and major prose of Whitman; the poems of Emily Dickinson. Prerequisite: Consent of the instructor or an A or B in any one of the following: Engl. 256, 289, 302, 307, 323, 324, 345 or 366. **W**
392. **The Negro in American Literature: Poetry.** 4 hours. Historical and analytical study of the Negro contribution to American poetry. Prerequisite: Junior standing or consent of the instructor. **F**
393. **The Negro in American Literature: Prose Fiction.** 4 hours. Historical and analytical study of the Negro contribution to American prose fiction. Prerequisite: Junior standing or consent of the instructor. **W**
394. **Studies in American-Negro Literature.** 4 hours. Detailed study of aspects of writing by American Negroes. Prerequisite: Junior standing or consent of the instructor. **S**
399. **Independent Study.** 1 to 4 hours. Open only to English majors and graduate students in English. Admission to this course is only on advice of and initiated by the English Department. Individual studies under the direction of an assigned faculty member. Nature of the work is determined by the tutor on the basis of the student's needs and interests. Prerequisite: Senior standing.

## FINANCE (Fin)

Asterisk (\*) indicates general education credit in social sciences.

- \*340. **Money and Banking.** 4 hours. Monetary and banking systems; the Federal Reserve System; monetary theory; price fluctuations; foreign-exchange

financing; specialized financial institutions in the United States. Prerequisite: Econ. 121.

341. **Business Finance. 4 hours.** Nature of business finance and its relation to economics, accounting, and law; legal nature and forms of business enterprise; capital, capitalization, and financial planning; financial analysis and interpretation; initial financing, refinancing, working capital; income administration, including dividend policies; expansion; internal and external financial and economic relationships of the firm. Prerequisites: Actg. 102, and Econ. 320.
342. **Investments. 4 hours.** Types and distinguishing features of securities, security markets, analysis of financial statements and principles of valuation, quality differences, selection of securities to meet varying personal and institutional objectives. Prerequisites: Fin. 340 and 341.
343. **Risk and Insurance. 4 hours.** Basic principles; applications in different areas (life and property insurance); management of risks in the firm (insurance versus self-insurance); social and economic significance of insurance in the economy. Prerequisites: Fin. 340 and 341.
344. **Investment Policy. 4 hours.** Varying strategies to meet diverse objectives; investments for individuals, business firms, banks, insurance companies, pension and profit-sharing funds; interrelation of investment policies and the economic environment. Prerequisites: Fin. 342 and Econ. 323.
345. **Problems in Business Finance. 4 hours.** Case studies of problems involving capital budgeting; administration of assets; calculation of financial requirements; provision of funds; dividend policies; special financial problems. Prerequisite: Fin. 341.

## FRENCH (Fr)

Asterisks (\*) indicate general education credit in humanities.

101. **Elementary French. 4 hours.** For students who have not studied French. Grammar, pronunciation, reading, composition, conversation. Two additional half hours per week in the language laboratory. **F, W, S**
102. **Elementary French. 4 hours.** Continues French 101. Two additional half hours per week in the language laboratory. Prerequisite: Fr. 101 or the equivalent. **F, W, S**
103. **Elementary French. 4 hours.** Continues French 102. Two additional half hours per week in the language laboratory. Prerequisite: Fr. 102 or the equivalent. **F, W, S, Su**



104. **Intermediate French. 4 hours.** Two additional half hours per week in the language laboratory. Rapid reading of modern authors, syntax and composition, conversational practice. Prerequisite: Fr. 103 or two years of high school French or the equivalent. **F, W, S**
105. **Intermediate French. 4 hours.** Two additional half hours per week in the language laboratory. Continues French 104. Prerequisite: Fr. 104 or the equivalent. **F, W, S**
106. **Intermediate French. 4 hours.** Two additional half hours per week in the language laboratory. Continues French 105. Prerequisite: Fr. 105 or the equivalent. **F, W, S, Su**
113. **Conversational Practice. 2 hours.** Supplements French 104, 105, and 106. Oral practice of the development of elementary conversational skill and the improvement of pronunciation. Prerequisites: Fr. 103 or two years of high school French and concurrent enrollment in Fr. 104, 105, or 106. **F, W, S**
121. **Elementary French, Honors Course. 5 hours.** Grammar, pronunciation, reading, composition, conversation. Open only to James Scholars and others with superior linguistic ability. Completion of French 121, 122, and 123 leads directly to French 105. Practice in the language laboratory is required. Prerequisite: Approval of the department. **F**
122. **Elementary French, Honors Course. 5 hours.** Continues French 121. Practice in the language laboratory is required. Prerequisite: Fr. 121. **W**
123. **Elementary French, Honors Course. 5 hours.** Continues French 122. Practice in the language laboratory is required. Prerequisite: Fr. 122. **S**
- \*161. **French Civilization I. 4 hours.** Same as History 161. History of French civilization from the end of the Middle Ages to the end of the Wars of Religion. The literature, the religious thought, the art, sciences, and music of this age in the domain of French culture. The teaching will combine the approaches of the historian with that of the literary critic. Prerequisite: Sophomore standing or consent of the instructor.
- \*162. **French Civilization II. 4 hours.** Same as History 162. History of French civilization in the seventeenth and eighteenth centuries. The literature of the classical period and of the French Enlightenment will be studied as an expression of the transformation of French society. Prerequisite: Fr. 161 or consent of the instructor.
- \*163. **French Civilization III. 4 hours.** Same as History 163. History of French civilization from the Revolution to the present. The nineteenth and twentieth centuries seen through the novels and memoirs. The music, art,

and philosophy of the age will be studied as part of the conflicts which attended urbanization, democratization, and the growth of modern nationalism. Prerequisite: Fr. 162 or consent of the instructor.

- \*185. Masterpieces of French Literature in English Translation. 4 hours.** Not open to students majoring or minoring in French. Satisfies general education requirement in humanities when taken in sequence with German 185 and Spanish 185. Reading of selected works from the seventeenth century to the present day.
- \*201. Introduction to French Literature I. 3 hours.** Reading of selected masterpieces. Prerequisite: Fr. 106 or four years of high school French. **F, W, S**
- \*202. Introduction to French Literature II. 3 hours.** Continues French 201. Prerequisite: Fr. 106 or four years of high school French. **F, W, S**
- \*203. Introduction to French Literature III. 3 hours.** Continues French 202. Prerequisite: Fr. 106 or four years of high school French. **F, W, S**
- 209. Conversation I. 3 hours.** Conversational practice to develop oral facility; exercises for the improvement of pronunciation and diction. Practice in the language laboratory is required. Prerequisite: Fr. 106 or four years of high school French. **F, W**
- 210. Conversation II. 3 hours.** Continues French 209. Practice in the language laboratory is required. Prerequisite: Fr. 209. **W, S**
- 211. Composition. 3 hours.** Training in writing French, translation from English, free composition. Prerequisite: Fr. 106 or four years of high school French. **F, W, S, Su**
- 212. Syntax. 3 hours.** Advanced study of rules of French grammar, with special attention to the analysis of sentence structure. Exercises in advanced composition. Prerequisite: Fr. 211 or consent of the instructor.
- 241. Social and Cultural History. 3 hours.** Social thought and the fine arts as background for the study of French literature. Prerequisites: Fr. 201, 202, and 203 or the equivalents. **W**
- 281. Introduction to Linguistics. 3 hours.** Study of French phonology, morphology, syntax, and semantics in comparison with English. Prerequisites: Fr. 210 and 211 or the equivalents.
- 282. Teachers Course. 3 hours.** Resources, classroom materials, standard practices, and problems in the teaching of French; practical application to actual classroom situations. Prerequisites: Fr. 201, 202, 203, 209, 210, 211, and 313 or 314, or consent of the instructor. **F**

299. **Tutorial Course.** 3 to 6 hours. Credit may be 3 hours, or 6 hours by permission of the department head, or the course may be repeated for a maximum of 6 hours. For seniors majoring in French; supplements regular courses. Prerequisites: Senior standing and approval of the department. **S, Su**
- \*313. **Stylistics I (Prose).** Undergraduate credit, 3 hours; graduate, 4 hours. Detailed analysis of the style of selected French authors; practice in advanced composition. Prerequisite: Fr. 211 or consent of the instructor. **S**
- \*314. **Stylistics II (Poetry).** Undergraduate credit, 3 hours; graduate, 4 hours. Detailed analysis of the style of selected French authors; practice in advanced composition. Prerequisite: Fr. 211 or consent of the instructor. **F**
- \*317. **Modern French Drama I.** Undergraduate credit, 3 hours; graduate, 4 hours. Major dramatists of the nineteenth and twentieth centuries. Prerequisites: Fr. 201, 202, and 203 or the equivalents or consent of the instructor. **F**
- \*318. **Modern French Drama II.** Undergraduate credit, 3 hours; graduate, 4 hours. Continues French 317. Prerequisites: Fr. 201, 202, and 203 or the equivalents or consent of the instructor. **W**
- \*319. **Modern French Drama III.** Undergraduate credit, 3 hours; graduate, 4 hours. Continues French 317 and 318. Prerequisites: Fr. 201, 202, and 203 or the equivalents or consent of the instructor. **S**
321. **French Literature of the Middle Ages.** Undergraduate credit, 3 hours; graduate, 4 hours. Major works, to be read in modern French. Prerequisites: Fr. 201, 202, and 203 or the equivalents. **F**
- \*322. **French Literature of the Sixteenth Century.** Undergraduate credit, 3 hours; graduate, 4 hours. Major writers, to be read in modern French. Prerequisites: Fr. 201, 202, and 203 or the equivalents. **F**
- \*323. **French Classical Literature I.** Undergraduate credit, 3 hours; graduate, 4 hours. Major French nondramatic writers of the seventeenth century. Prerequisites: Fr. 201, 202, and 203 or the equivalents. **F**
- \*324. **French Classical Literature II.** Undergraduate credit, 3 hours; graduate, 4 hours. Major dramatists of the seventeenth century. Prerequisites: Fr. 201, 202, and 203 or the equivalents or consent of the instructor. **F**
- \*325. **French Literature of the Eighteenth Century I.** Undergraduate credit, 3 hours; graduate, 4 hours. Major nondramatic writers. Prerequisites: Fr. 201, 202, and 203 or the equivalents. **W**
- \*326. **French Literature of the Eighteenth Century II.** Undergraduate credit, 3 hours; graduate, 4 hours. Major dramatists. Prerequisites: Fr. 201, 202, and 203 or the equivalents or consent of the instructor. **W**

- \*327. French Poetry I. Undergraduate credit, 3 hours; graduate, 4 hours.** Major poets from the fourteenth through the eighteenth centuries. Prerequisites: Fr. 201, 202, and 203 or the equivalents or consent of the instructor. **W**
- \*328. French Poetry II. Undergraduate credit, 3 hours; graduate, 4 hours.** Major poets of the nineteenth and early twentieth centuries. Prerequisites: Fr. 201, 202, and 203 or the equivalents or consent of the instructor. **S**
- \*329. French Poetry III. Undergraduate credit, 3 hours; graduate, 4 hours.** Major poets of the twentieth century. Prerequisites: Fr. 201, 202, and 203 or the equivalents or consent of the instructor.
- \*331. The French Novel of the Nineteenth Century I. Undergraduate credit, 3 hours; graduate, 4 hours.** Major novelists. Prerequisites: Fr. 201, 202, and 203 or the equivalents. **F**
- \*332. The French Novel of the Nineteenth Century II. Undergraduate credit, 3 hours; graduate, 4 hours.** Major novelists. Prerequisites: Fr. 201, 202, and 203 or the equivalents. **W**
- \*333. The French Novel of the Nineteenth Century III. Undergraduate credit, 3 hours; graduate, 4 hours.** Major novelists. Prerequisites: Fr. 201, 202, and 203 or the equivalents. **S**
- \*337. The French Novel of the Twentieth Century I. Undergraduate credit, 3 hours; graduate, 4 hours.** Reading and analysis of selected novels from 1900 to 1940. Prerequisites: Fr. 201, 202, and 203 or the equivalents. **W**
- \*338. The French Novel of the Twentieth Century II. Undergraduate credit, 3 hours; graduate, 4 hours.** Reading and analysis of selected novels from 1940 to the present. Prerequisites: Fr. 201, 202, and 203 or the equivalents. **W**
- \*342. The Pleiade. Undergraduate credit, 3 hours; graduate, 4 hours.** Theory and practices of the Pleiade poets. Prerequisites: Fr. 201, 202, and 203 or the equivalents. **W**
- \*345. Montaigne: His Essais and His Age. Undergraduate credit, 3 hours; graduate, 4 hours.** Detailed study of Montaigne's life, thought, and times as reflected in the Essais. Prerequisites: Fr. 201, 202, 203 or the equivalents.
- \*350. Preromanticism. Undergraduate credit, 3 hours; graduate, 4 hours.** The Preromantic movement in France from 1761 to 1814. Prerequisites: Fr. 201, 202, and 203 or the equivalents. **F**
- \*351. French Romanticism I. Undergraduate credit, 3 hours; graduate, 4 hours.** Reading and analysis of selected works tracing the main developments in the Romantic movement from 1815 to 1829. Prerequisites: Fr. 201, 202, and 203 or the equivalents. **W**

- \*352. French Romanticism II.** Undergraduate credit, 3 hours; graduate, 4 hours. Reading and analysis of selected works tracing the main development in the Romantic movement after 1830. Prerequisites: Fr. 201, 202, 203 or the equivalents. **S**
- \*355. Literary and Intellectual Currents of the Eighteenth Century.** Undergraduate credit, 3 hours; graduate, 4 hours. Reading and analysis of selected works tracing major literary and intellectual currents. Prerequisites: Fr. 201, 202, and 203 or the equivalents. **F**
- \*360. Major Trends in French Literature.** Undergraduate credit, 3 hours; graduate, 4 hours. Selected writings to illustrate major trends instrumental in the formation of critical and aesthetic principles of French literature. Prerequisites: Fr. 201, 202, and 203 or the equivalents or consent of the instructor. **F**
- \*362. The French Novel from 1600 to 1715.** Undergraduate credit, 3 hours; graduate, 4 hours. Reading and analysis of selected novels of the period. Prerequisites: Fr. 201, 202, and 203, or consent of the instructor. **S**
- \*363. The French Novel from 1715 to 1789.** Undergraduate credit, 3 hours; graduate, 4 hours. Reading and analysis of selected novels of the period. Prerequisites: Fr. 201, 202, and 203 or the equivalents or consent of the instructor.

## **GEOGRAPHY (Geog)**

One asterisk (\*) indicates general education credit in natural sciences.

Two asterisks (\*\*) indicate general education credit in social sciences.

- \*101. Physical Geography I: Landforms and Mineral Resources.** 4 hours. The earth and its resources; the earth grid and its portrayal on maps; interpretation of landforms from a geographic point of view; occurrence and use of mineral resources. **F, W, S, Su**
- \*102. Physical Geography II: Earth-Sun Relations and Elements of Weather.** 4 hours. Planetary relations; the atmosphere, its composition, function, and behavior in the production of weather types; airmasses and airmass analysis. **F, W, S, Su**
- \*103. Physical Geography III: Climate, Vegetation, and Soils.** 4 hours. Climatic types and climatic regions; factors that give order and logic to their areal distribution; biotic and edaphic types and regions in relation to climatic phenomena. Prerequisite: Geog. 102. **F, W, S**
- \*\*104. Cultural Geography I: World Regional Geography.** 5 hours. Geographic structure of the world; regional patterns of settlement and land utilization of resources. **F, W, S, Su**



- \*\*105. Cultural Geography II: World Patterns of Production.** 4 hours. Man's utilization of the major economic resources of the world from the standpoint of geographic patterns and the utilization of resources. **F, W, S**
- 109. Basic Maps and Graphics.** 4 hours. An introductory course on the use of maps and other graphic materials. Demonstration and evaluation of slides, films, prints, models, and maps for teaching and other purposes. Preparation of representative graphic materials. **S**
- \*\*114. Conservation of Natural Resources.** 4 hours. The conservation of soil, water, plant, animal, mineral, and recreational resources; general principles of conservation as they apply to the United States. Individual readings and projects are assigned. Prerequisite: One course in geography or consent of the instructor. **F, S**
- \*\*123. Geography of Illinois.** 3 hours. Detailed regional study of the state; special emphasis on the cultural relations of Illinois to the rest of the nation. Prerequisite: One course in geography or consent of the instructor. **W**
- 185. Introduction to Social Science Research Methods.** 4 hours. Same as Sociology 185. The application of statistical methods in social science. Topics include research design and the role of statistics in sociological investigation, measures of central tendency and dispersion, simple correlation techniques, contingency analysis, interpretation of survey findings, and introduction to statistical inference. One hour per week of laboratory work in data analysis. Prerequisite: Soc. 100 or 8 hours of geography or 8 hours of sociology or consent of the instructor.
- 196. Freshman Honors Seminar I.** 2 hours. World cities and comparative urbanization. Intensive exposure to the development and pattern of urbanization; to the growth of major integrating centers of political and economic power; to the world cities. Prerequisite: James Scholar or other honors status. **F**
- 197. Freshman Honors Seminar II.** 2 hours. Regional analysis of the Lower Mekong; physical and cultural landscapes; people and economy; problems of industrialization and political stability; the region as an illustration of an emerging area. Prerequisite: James Scholar or other honors status. **W**
- 198. The Geography of Religions.** 2 hours. Broad treatment of geographical manifestations of the major religious systems of the world. Special attention to the geographic origins and dispersals of religious systems, the way man organizes his life within the framework of his belief; intensive study of applications being made in the geographical study of religions. Prerequisite: James Scholar or other honors designation.
- \*\*204. Cultural Geography.** 3 hours. Human responses to the earth's physical environment. Major geographic problems in cultural history, cultural

areas and distributions, cultural origins and dispersals, cultural landscapes, and cultural ecology. **F**

- \*\*205. Areal Organization of Activities. 3 hours.** Models relating to the spatial elements of activities with applications to urban and regional growth and development. **W**
- \*209. Introduction to Astronomy. 4 hours.** Same as Physics 209. An introductory and essentially non-mathematical course for superior students who are not science majors. Prerequisite: Consent of the instructor.
- \*\*221. The United States and Canada. 4 hours.** A survey of the principal economic activities in each of the major geographic regions of North America from the standpoint of their relation to the natural environment. Emphasis on the regional equipment for industry in the several divisions of the continent. Problems and outlook in the major regions of the United States and Canada. Prerequisite: 10 hours of geography or consent of the instructor. **F, W, S, Su**
- \*\*225. South America. 4 hours.** Regional geography; physical regions, people, economic resources, and political alignments. Prerequisite: 10 hours of geography or consent of the instructor. **F, S**
- \*\*265. Geographic Aspects of Transportation. 4 hours.** Principles; world patterns of land, air, and sea transportation routes, facilities and traffic; relations of transportation to regional development; selected problems in the geographic aspects of railway, highway, and pipeline transportation. Individual projects and readings are assigned. Prerequisite: 8 hours of geography or economics, or consent of the instructor.
- 291. Field Geography. 4 hours.** Class meets on seven selected Saturdays from 8 A.M. to 4 P.M. Field techniques based on observation of physical and cultural landscapes of the Chicago metropolitan area, Northern Illinois, and Southern Wisconsin. Prerequisites: Geography major and Geog. 101 and 103. **F**
- 301. Fundamentals of Landform Analysis. 3 hours.** Theories of landform processes and techniques of analysis. Prerequisite: Geog. 101 or GeolS. 102 or consent of the instructor. **W**
- 303. Climates of the Continents. 4 hours.** The world's climates; controls and distribution; problems of classification and regional analysis. Prerequisite: Geog. 103 or consent of the instructor.
- 326. Geography of Middle America. 4 hours.** Physical landscapes and the human responses (cultural, economic, and political) to them in Mexico, Central America, and the West Indies. Prerequisite: 10 hours of geography or consent of the instructor. **W**

- \*\*331. Western Europe. 4 hours.** A regional analysis of the economic, social, and political development of people in relation to the location of Europe and its natural regions and the physical elements of land relief, climate, soil, and other natural resources. Emphasis on Britain, France, and Germany. Prerequisite: 10 hours of geography or consent of the instructor. **F**
- \*\*333. Eastern Asia. 4 hours.** Physical and cultural landscapes of China, Japan, and Korea; physical regions, people, economy, and political alignments. Prerequisite: 10 hours of geography or consent of the instructor. **F**
- \*\*334. Southern and Southeastern Asia. 4 hours.** Physical and cultural landscapes; physical regions, people, mineral wealth, agricultural production, manufacturing, trade, political alignments. Prerequisite: 10 hours of geography or consent of the instructor. **W**
- \*\*336. The U.S.S.R. 4 hours.** Physical and cultural landscapes; regional analysis of resources and economy; the geographic basis of the nation's role in world affairs. Prerequisite: 10 hours of geography or consent of the instructor. **W**
- \*\*338. Africa, South of the Sahara. 4 hours.** A regional analysis of the relationship between natural resources, economic development, and the evolution of the many political units. Prerequisite: 10 hours of geography or consent of the instructor. **S**
- 341. Geographic Information Systems I. 3 hours.** Problems encountered in the gathering and use of geographic data and the structuring of research within the light of existing relevant theory, measurement systems capabilities, and recognized objectives of research activities. Topics include review of data sources, methods of measurement, sampling models, and problems of dealing with aggregated reporting units, records matching, and missing data. Prerequisites: 12 hours of geography, excluding Geog. 101 through 105, and Math. 101, or 104 and 105, or Phil. 101, 150, or Soc. 185, or Qm 172. **F**
- 342. Geographic Information Systems II. 3 hours.** Application of inferential statistical techniques and probability models in geographic research. Topics include use of descriptive parameters in recognizing geographic relationships, tests of significance, and recognition of particular areal patterns. Prerequisite: Geog. 341 or consent of the instructor.
- 343. Geographic Information Systems III. 3 hours.** Problems encountered in the management and portrayal of geographic data. Topics include preparation of data for manual and machine processing, data condensation and characterization, observation indexing, and the preparation of graphic and tabular displays. Prerequisite: Geog. 342 or consent of the instructor.
- 351. Cartography. 4 hours.** Construction of maps and graphs; evaluation of source materials; writing of map specification; use and care of cartographic

equipment; techniques of graphic reproduction. Prerequisite: Consent of the instructor. **F, S**

**355. Map Interpretation and Evaluation. 4 hours.** Evaluation of map components; map readings; historical development of maps; survey of world maps and mapping. Emphasis on the evaluation, interpretation, and use of data portrayed on maps. **W**

**\*\*361. Agricultural Regions and Land Utilization. 4 hours.** The nature of land utilization from the world, continental, and regional viewpoints; the types of agricultural land use; the interrelationships between areas of different types of land use. **F**

**\*\*363. Manufacturing Regions of the World. 4 hours.** World distribution of manufacturing industries. The relative importance of industry in the major economies of the world; factors in the location of principal types of manufacturing; detailed analysis of selected industrial districts. Prerequisite: Junior standing. **S**

**\*\*371. Urban Geography. 4 hours.** Distribution of cities; urban patterns, forms, and functions; classification of urban centers and tributary areas; systems of urban land classification; forces affecting urban land uses; the geographic aspects of city planning. Prerequisite: Junior standing. **F**

**\*\*337. Political Geography. 4 hours.** World pattern of nations in relation to their natural environment; population and economic factors in world affairs; emphasis on regional concepts and problems of the non-Western world. Individual projects and readings are assigned. **F, S**

**391. Senior Seminar. 3 hours.** Introduction to the theory and technique of geographic research; modern geographic philosophy; interpretive analysis of bibliographic sources and the preparation of a bibliography. Preparation and evaluation of individual papers on selected topics. Prerequisites: Senior standing and declared major or minor in geography. **W**

**392. Field Geography of Western Europe. 12 hours.** Field observation and analysis of physical environments and human response from the North European Plain to the Mediterranean Sea; physical regions, people, and economic life. Two weeks on campus; seven weeks in Europe. Individual term projects. Prerequisites: One year of geography and consent of the instructor.

**399. Special Studies in Geography. 2 to 5 hours.** May be repeated twice for credit for a total of 10 hours. Readings and reports in selected fields chosen in consultation with the instructor. Prerequisites: Senior standing or consent of the instructor.

**GEOLOGICAL SCIENCES (GeoS)**

Asterisks (\*) indicate general education credit in natural sciences.

- \*101. Principles of Geology I. 4 hours.** Analysis of the earth's surficial features: weathering and erosion, soils, groundwater, glaciers, streams, oceans and shorelines, deserts. Half-day Saturday field trip required.
- \*102. Principles of Geology II. 4 hours.** The origin, age, and composition of the earth; introduction to rocks and minerals; metamorphism, magmatic evolution, isostasy, earthquakes, geophysical considerations of the earth's interior.
- \*103. Principles of Geology III. 4 hours.** Geologic history and evolution of the earth and its life; geosynclinal theory, uniformitarianism, methods of interpreting earth history. One-day Saturday field trip required. Prerequisites: GeoS. 101 and 102, or consent of the instructor.
- \*110. Field Work. 3 hours.** Observation in the St. Francois Mountains and adjacent parts of Missouri and Illinois. Registration, winter quarter; two three-hour class meetings, held during spring vacation. Credit is given on completion of a satisfactory written report. Prerequisite: GeoS. 102 or 150 or PSci. 103.
- 111. Principles of Geology. 1 hour.** For honors students. May be taken three times, each time with concurrent registration in Geological Sciences 101, 102, or 103 or once with concurrent registration in Geological Sciences 150. Prerequisite: Concurrent registration in the honors section of GeoS. 101, 102, 103 or 150 or consent of the instructor.
- 150. Geology for Engineers. 4 hours.** Application of elementary geology to engineering. Prerequisite: Sophomore standing in the College of Engineering.
- \*204. Crystallography. 4 hours.** Morphological, optical, and introductory structural crystallography; features of mineralogical significance. Prerequisite: One quarter of college chemistry.
- \*205 Mineralogy. 4 hours.** Origin and properties of common minerals. Crystal chemistry of major mineral groups. Laboratory study and identification of minerals and rocks. Prerequisite: GeoS. 204 or the equivalent.
- \*206. Petrology. 4 hours.** Origin, occurrence, and chemical characteristics of igneous and metamorphic rocks. Introduction to phase equilibria. Laboratory emphasizes application of petrographic and X-ray diffraction techniques to problems of rock genesis. Prerequisite: GeoS. 205.



- \*218. Introduction to Paleontology. 4 hours.** Same as Biological Sciences 218. The phylogeny, morphology, and ecology of fossils; emphasis on the invertebrates. Two or three Saturday field trips are required. Prerequisite: One year of biological sciences or consent of the instructor.
- \*219. Stratigraphy and Sedimentation I. 4 hours.** Origin, description, and interpretation of sedimentary rocks. Prerequisite: GeolS. 103.
- \*220. Stratigraphy and Sedimentation II. 4 hours.** Continues Geological Sciences 219.
- \*230. Introduction to Oceanography. 4 hours.** A physical description of the marine environment: physical and chemical properties of sea water; currents, wave action, tidal forces, geography and geology of the ocean basins. Relation of the marine organism to the physical environment. Prerequisite: Consent of the instructor.
- \*235. Astrogeology. 4 hours.** Data and major theories of the origin and evolution of the universe, solar system, and earth; lunar geology, meteors and meteorites, artificial satellite data. Prerequisite: GeolS. 103 or consent of the instructor.
- \*240. Economic Geology. 4 hours.** Principles and techniques of mineral exploration, evaluation, and exploitation. Origin and occurrence of economic mineral materials, including petroleum and natural gas. Prerequisite: Consent of the instructor.
- 299. Introduction to Research.** Credit to be arranged. Independent study. Each student who desires to register must present to the head of the department a written statement from the instructor under whom he is to work. Only those students who write a thesis are recommended for graduation with the departmental distinction. Prerequisite: Consent of the instructor.
- 303. Advanced Physical Geology I. 4 hours.** The physical nature of the earth; the manner in which the materials of the earth determine structure; description of earth structures and structural processes; techniques of structural analysis. Prerequisites: GeolS. 103, 206, and consent of the instructor.
- 304. Advanced Physical Geology II. 4 hours.** Problems in earth chemistry, physics, and history. Prerequisite: GeolS. 303.
- 316. Invertebrate Paleontology. 4 hours.** Same as Biological Sciences 316. Phylogeny, morphology, and ecology of the fossil invertebrates. Prerequisites: GeolS. 218 and consent of the instructor.
- 317. Field Geology in the Rocky Mountains. 12 hours.** Conducted from a locality in the Rocky Mountains. Field Training in stratigraphy, structure,

and geomorphology; geologic mapping with plane table and serial photographs. Approximate cost \$250 to \$305. Prerequisite: GeolS. 103 and 206 or consent of the instructor.

318. **Vertebrate Paleontology.** 4 hours. Same as Biological Sciences 318. Phylogeny, morphology, and ecology of the fossil vertebrates. Prerequisites: One year of biological sciences and consent of the instructor.
319. **Paleobotany.** 5 hours. Same as Biological Sciences 319. Structure, phylogeny, and stratigraphic distribution of representative fossil plants. Lecture, laboratory, and field trips. Prerequisite: One year of biological sciences.
335. **Geochemistry.** 4 hours. Principles of the distribution of the elements in the earth's crust. Element partitioning between coexisting minerals. Origin of the elements. Introduction to thermodynamic considerations of mineral equilibria. Prerequisites: Chem. 112, 113, and 114, or consent of the instructor.
345. **Advanced Crystallography.** 4 hours. Crystalline properties of minerals. Theory and practice of determining the Crystalline structure of minerals. Prerequisite: GeolS. 205 or consent of the instructor.
350. **Hydrogeology.** 4 hours. The occurrence, storage, movement, and quality of water in rocks of the earth's crust. Prerequisites: GeolS. 103, 220, credit or concurrent registration in Math. 133, or consent of the instructor.
360. **Introductory Geophysics.** 4 hours. The shape and figure of the earth, gravity, seismology, and magnetism. Thermodynamics of the earth; atmospheric and planetary geophysics. Prerequisite: Consent of the instructor.
365. **Statistical Methods in Geology.** 4 hours. Introductory course. Sampling from geological populations, statistical inference, and hypothesis testing; statistics of orientation data; trend surface methods; multivariate correlation techniques; time series analysis. Prerequisite: Math. 370 or consent of the instructor.
370. **Engineering Geology.** 4 hours. Applications of geology to major engineering problems and operations. Prerequisites: GeolS. 150, 206, Math. 132, Phys. 144, or consent of the instructor.

## GERMAN (Ger)

Asterisks (\*) indicate general education credit in humanities.

101. **Elementary German.** 4 hours. Four additional half hours per week in the language laboratory. Reading, grammar, and simple oral practice. W, S, Su, F

102. **Elementary German. 4 hours.** Four additional half hours per week in the language laboratory. Prerequisite: Ger. 101 or the equivalent. **W, S, Su, F**
103. **Elementary German. 4 hours.** Four additional half hours per week in the language laboratory. Continues German 102. Prerequisite: Ger. 102 or the equivalent. **W, S, Su, F**
104. **Intermediate German. 4 hours.** Four additional half hours per week in the language laboratory. Reading, grammar review, and oral communication. Prerequisite: Ger. 103 or 122 or the equivalent. **W, S, Su, F**
105. **Intermediate German. 4 hours.** Four additional half hours per week in the language laboratory. Continues German 104. Prerequisite: Ger. 104 or 123 or the equivalent. **W, S, Su, F**
106. **Intermediate German. 4 hours.** Four additional half hours per week in the language laboratory. Continues German 105. Prerequisite: Ger. 105 or 135 or the equivalent. **W, S, Su, F**
107. **Practice in Reading Skills. 2 hours.** Not open to students who have had German 134, 135, or 136. Developmental course in reading dynamics for German majors who have not had the departmental pre-major sequence. Prerequisites: Ger. 106 and concurrent registration in Ger. 221. **F, S**
108. **Reading German I. 4 hours.** An accelerated course for beginners; designed to prepare students for reading examinations in German. Interpretation of specialized texts in the humanities, social sciences, and natural sciences. Does not meet graduation requirements in foreign language. Primarily for upper division and graduate students in other departments. **W**
109. **Reading German II. 4 hours.** Continues German 108. Prerequisite: Ger. 108 or the equivalent. **S**
113. **Conversation and Composition I. 2 hours.** Need not be taken in sequence. Prerequisite: Ger. 103 or the equivalent. **F**
114. **Conversation and Composition II. 2 hours.** Need not be taken in sequence. Prerequisite: Ger. 103 or the equivalent. **W**
115. **Conversation and Composition III. 2 hours.** Need not be taken in sequence. Prerequisite: Ger. 103 or the equivalent. **S**
121. **Elementary German. Honors Course. 5 hours.** Listening, speaking, reading, and writing. Four classes per week plus additional work in the language laboratory. Recommended for prospective German majors, teaching majors, James Scholars, and others with special interest and ability in language. Prerequisite: Satisfactory score on Linguistic Aptitude Test. **F**

122. **Elementary German. Honors Course. 5 hours.** Four classes per week plus additional work in the language laboratory. Continues Ger. 121. Prerequisite: Ger. 121 with at least a B grade or 101 with an A grade or approval of the department. **W**
123. **Elementary German. Honors Course. 5 hours.** Four classes per week plus additional work in the language laboratory. Continues German 122. Prerequisite: Ger. 122 with at least a B grade or 102 with an A grade or approval of the department. **S**
134. **Intermediate German. Honors Course. 5 hours.** Reading, listening, speaking, and writing. Four classes per week plus additional work in the language laboratory. Prerequisite: Ger. 123 with at least a B grade or 103 with an A grade or approval of the department, or satisfactory score on German placement test. **F**
135. **Intermediate German. Honors Course. 5 hours.** Four classes per week plus additional work in the language laboratory. Prerequisite: Ger. 134 with at least a B grade or 104 with an A grade or approval of the department. **W**
136. **Intermediate German. Honors Course. 5 hours.** Four classes per week plus additional work in the language laboratory. Completes the foreign language requirement for graduation in the College of Liberal Arts and Sciences. Prerequisite: Ger. 135 with at least a B grade or 105 with an A grade or approval of the department. **S**
- \*185. **Masterpieces of German Literature in English Translation. 4 hours.** Not open to German majors. Satisfies general education requirement in humanities when taken in sequence with French 185 and Spanish 185.
201. **Writing and Speaking German I. 4 hours.** One to four additional half hours per week in the language laboratory. Phonetics, grammar, syntax, vocabulary development; training in oral and written communication. Prerequisite: Ger. 106 or the equivalent. **W, F**
202. **Writing and Speaking German II. 4 hours.** One to four additional half hours per week in the language laboratory. Continues German 201. Prerequisite: Ger. 201 or the equivalent. **W, S**
203. **Writing and Speaking German III. 4 hours.** One to four additional half hours per week in the language laboratory. Continues German 202. Prerequisite: Ger. 202 or the equivalent. **S, F**
204. **Writing and Speaking German IV. 4 hours.** Continues German 203. Prerequisite: Ger. 203 or the equivalent. **F**
206. **Corrective German Phonetics. 1 hour.** May be repeated once for credit. Pronunciation and intonation practice. Prerequisite: Ger. 106 or the equivalent. **W, S, F**

207. **German Grammar for Teachers. 4 hours.** Intensive study and review of problems of German grammar and syntax. Prerequisite: Ger. 204 or the equivalent or consent of the instructor.
218. **Franz Kafka. 4 hours.** Given in English. Major works and selections from the short stories; letters and diaries. Prerequisite: Junior standing or consent of the instructor.
219. **Thomas Mann. 4 hours.** Given in English. A detailed study of the three major novels and selections from the short stories and essays. Prerequisite: Junior standing or consent of the instructor.
220. **German Culture and Civilization. 3 hours.** A survey of the development of German culture from earliest times to the present: art, architecture, music, society. Lectures, selected readings, and slides. Prerequisite: Ger. 106 or the equivalent. W
- \*221. **Introduction to German Literature. 4 hours.** A linguistic and literary introduction to the various genres. Prerequisite: Ger. 106 or the equivalent. S, F
230. **Contrastive Applied Linguistics. 3 hours.** German phonology, morphology, syntax, and semantics in comparison with English. Prerequisite: Ger. 202 or the equivalent. S
240. **The Teaching of German in the Secondary School and College. 3 hours.** Modern techniques, including the use of the language laboratory, in the teaching of German. Prerequisite: Ger. 230. F
- \*290. **Masterworks of German Literature I. 4 hours.** The classical period. Prerequisite: Ger. 221 or the equivalent. W
- \*292. **Masterworks of German Literature II. 4 hours.** Romanticism and poetic realism. Prerequisite: Ger. 221 or the equivalent. S
- \*294. **Masterworks of German Literature III. 4 hours.** From Naturalism to the present. Prerequisite: Ger. 221 or the equivalent. F
298. **Honors Thesis. 4 hours.** Restricted to German majors in their last year of work toward completion of the major. May not be taken in the last quarter in which student expects to graduate. Prerequisites: Ger. 290, 292, 294, or the equivalent, and at least a 4.6 average in all German courses previously taken. S
299. **Independent Study. 1 to 3 hours.** May be repeated for credit. Open only to German majors and minors who are working on special projects. Prerequisites: Ger. 106 or the equivalent and approval of the department. W, S, Su, F



320. **Writing and Speaking German V.** 3 hours. Prerequisite: Ger. 204 or the equivalent.
321. **Writing and Speaking German VI.** 3 hours. Prerequisite: Ger. 320 or the equivalent.
- \*370. **The German Novelle.** 4 hours. Reading and interpretation of representative *Novellen* of the nineteenth and twentieth centuries. Prerequisites: Ger. 221 and two additional German literature courses or consent of the instructor. **F**
- \*372. **German Drama.** 4 hours. Development of the German drama from the Enlightenment to the present. Prerequisites: Ger. 221, and two additional German literature courses or consent of the instructor. **W**
- \*374. **Poetry from the Seventeenth Century to the Present.** 4 hours. Prerequisite: Ger. 221 and two additional German literature courses or consent of the instructor. **S**
380. **Goethe's Faust.** 4 hours. Intensive study of Parts I and II. Prerequisites: Ger. 221 and two additional German literature courses or consent of the instructor. **S**
- \*382. **German Literature to 1750.** 4 hours. Prerequisites: Ger. 221 and two additional German literature courses or consent of the instructor. **F**
385. **Germanic Linguistics.** 4 hours. Linguistic geography, "Sprachschichten", and principles of structural linguistics. Prerequisite: Ger. 203 or the equivalent. **F**
390. **Topics in German Literature.** 4 hours. May be taken more than once for credit. Reading and discussion of the work of one prominent German author or of a group of related authors. Subject varies and is chosen by the instructor. Prerequisites: Ger. 290, 292, 294, or consent of the instructor. **W, Su**

## GREEK (Gr)

Asterisks (\*) indicate general education credit in humanities.

100. **Classical Greek.** 4 hours. Not open to majors in Greek. Intensive introductory course. Rapid introduction to the language of Homer and Plato. Designed for students who wish sufficient training to begin reading on their own.

101. **Elementary Greek I. 4 hours.** The fundamentals of ancient classical Greek, including the reading of simple prose. Eligibility will be tested during the first meeting.
102. **Elementary Greek II. 4 hours.** Continues Greek 101. Grammar and reading. Prerequisite: Gr. 101 or the equivalent. **W**
103. **Elementary Greek III. 4 hours.** Continues Greek 102. Prerequisite: Gr. 102 or the equivalent. **S**
104. **Intermediate Greek I. 4 hours.** Introduction to epic poetry. Selections from Homer. Prerequisite: Gr. 103 or the equivalent. **F**
105. **Intermediate Greek II. 4 hours.** Introduction to dramatic poetry. Prerequisite: Gr. 104 or the equivalent. **W**
106. **Intermediate Greek III. 4 hours.** Introduction to philosophic prose: Study of Plato's *Socratic Dialogues*. Prerequisite: Gr. 105 or the equivalent. **S**
- \*201. **Xenophon: Hellenica, Books I and II. 4 hours.** Reading and translation. Prerequisite: Gr. 106 or the equivalent.
- \*202. **Plato: Socratic Dialogues. 4 hours.** Reading and translation of at least two of the following: *Apology*, *Crito*, *Charmides*, *Laches*, *Euthyphro*, *Hippias Minor*, *Ion*. Prerequisite: Gr. 106 or the equivalent.
- \*203. **Attic Orators. 4 hours.** Reading and translation of selected orations by one or more of the Attic orators. Prerequisite: Gr. 106 or the equivalent.
- \*205. **Homer: Odyssey. 4 hours.** Reading and translation of selections. Prerequisite: Gr. 106 or the equivalent.
- \*210. **Greek Lyric Poetry. 4 hours.** Reading and translation of selections from the lyric poets. Prerequisite: Gr. 106 or the equivalent.
- \*211. **Prose Composition. 3 to 4 hours.** May be repeated for a total of 6 hours. Extensive practice in translation from English to Greek, with review of syntax and morphology. Required of students majoring in Greek. Offered only in alternate years. Prerequisite: Gr. 106 or the equivalent.
- \*215. **Aeschylus: Tragedies. 4 hours.** Reading and translation of one or more of the tragedies of Aeschylus. Prerequisite: Gr. 106.
- \*220. **Sophocles: Tragedies. 4 hours.** Reading and translation of one or more of the tragedies of Sophocles. Prerequisite: Gr. 106 or the equivalent.
- \*225. **Euripides: Tragedies. 4 hours.** Reading and translation of one or more of the tragedies of Euripides. Prerequisite: Gr. 106 or the equivalent.

- \*275. **Herodotus: Histories.** 4 hours. Reading and translation of portions of several of the books. Prerequisite: Gr. 106.
- \*299. **Independent Reading.** 4 hours. Individual study under faculty direction. For students qualified by preparation and interest. Prerequisite: Gr. 201 or the equivalent. W, S, F

## HEALTH SCIENCE (HSci)

180. **Personal and Community Health.** 3 hours. Fundamentals of medical science; dynamics of health in the individual, the family, and the community. Scientific prevention of illness; health protection; principles of treatment of common medical problems.
240. **Mental Health in the Modern Urban Community: Problems and Prospects.** 3 hours. Definition of urban problems and their impact upon the mental health of the individual, the family, and the community. Health, education, housing, ethnic, racial, employment, criminal, and other factors—their impact on individuals and families. Evaluation of programs for prevention and processes of treatment from the viewpoint of the individual and the community. Prerequisite: Sophomore standing. HSci. 180 is recommended.

## HEBRAIC STUDIES (Heb)

These courses have been approved by the College of Liberal Arts and Sciences and are taken on the campus of the College of Jewish Studies. Registration in these courses does not involve concurrent enrollment.

101. **Elementary Hebrew.** 4 hours. For students who have not studied Hebrew. Grammar, pronunciation, reading, composition, and conversation.
102. **Elementary Hebrew.** 4 hours. Continues Hebrew 101. Prerequisite: Heb. 101 or the equivalent.
103. **Elementary Hebrew.** 4 hours. Continues Hebrew 102. Prerequisite: Heb. 102.
104. **Intermediate Hebrew.** 4 hours. Rapid reading of modern authors and Israeli newspapers. Syntax and composition; conversational practice. Prerequisite: Heb. 103 or the equivalent.
105. **Intermediate Hebrew.** 4 hours. Continues Hebrew 104. Prerequisite: Heb. 104 or the equivalent.

106. **Intermediate Hebrew. 4 hours.** Continues Hebrew 105. Prerequisite: Heb. 105 or the equivalent.

## HISTORY (Hist)

One asterisk (\*) indicates general education credit in humanities (300-level courses: with consent of the instructor).

Two asterisks (\*\*) indicate general education credit in social sciences.

- \*110. **History of Europe from 800 to 1450. 4 hours.** The rise and development of the medieval church, the organization of the feudal monarchies, the laying of the foundation for western European economy, culture and intellectual developments of the Middle Ages.
- \*111. **History of Europe from 1450 to 1750. 4 hours.** The rise of the modern bureaucratic state; emphasis on the contribution of religious, economic, and intellectual developments of the sixteenth and seventeenth centuries to the emergence of the modern state, in both international and internal politics.
- \*112. **History of Europe from 1750 to 1870. 4 hours.** Transfer of power of kings, who ruled by Divine Right, to representatives elected to defend popular sovereignty; Bourgeois Revolution, consolidation of nationalism and popular sovereignty.
- \*113. **History of Europe from 1870 to the Present. 4 hours.** Expansion of industrial powers and resultant imbalance in European society; change from agrarian to urban civilization with alteration in balance of power that led to the two great wars; subsequent political problems.
- \*131. **History of England to 1485. 4 hours.** England from the Celtic immigration to the accession of Henry VII.
- \*132. **History of England from 1485 to 1714. 4 hours.** England during the reigns of the Tudors and the Stuarts.
- \*133. **History of England from 1714 to the Present. 4 hours.** England from the accession of the Hanoverians.
- \*\*151. **History of the United States to the 1820's. 4 hours.** From colony to nationhood: European foundations; colonial developments; independence and early nationhood.
- \*\*152. **History of the United States from the 1820's to the 1890's. 4 hours.** America in the nineteenth century: the making of an independent nation. Jacksonian democracy, changing political issues and parties, the Civil War, Reconstruction, the consequences of the Industrial Revolution.

- \*\*153. History of the United States from 1890 to the Present. 4 hours.** American politics in the twentieth century; adjustment to world power; problems of economic and social change in modern times.
- \*161. French Civilization I. 4 hours.** Same as French 161. History of French civilization from the end of the Middle Ages to the end of the Wars of Religion. The literature, the religious thought, the art, sciences, and music of this age in the domain of French culture. The teaching will combine the approaches of the historian with that of the literary critic. Prerequisite: Sophomore standing or consent of the instructor.
- \*162. French Civilization II. 4 hours.** Same as French 162. History of French civilization in the seventeenth and eighteenth centuries. The literature of the classical period and of the French Enlightenment will be studied as an expression of the transformation of French society. Prerequisite: Hist. 161 or consent of the instructor.
- \*163. French Civilization III. 4 hours.** Same as French 163. History of French civilization from the Revolution to the present. The nineteenth and twentieth centuries will be seen through novels and memoirs. The music, art, and philosophy of the age will be studied as part of the conflicts which attended urbanization, democratization, and the growth of modern nationalism. Prerequisite: Hist. 162 or consent of the instructor.
- \*\*171. West Africa from 2000 B.C. to the Present. 4 hours.** Introduction to the major pre-European, colonial, and post-independence aspects of African developments.
- \*\*172. East and Northeast Africa from 4000 B.C. to the Present. 4 hours.** Introduction to the major pre-European, colonial, and post-independence aspects of African developments.
- \*\*173. South and Central Africa from 100 B.C. to the present. 4 hours.** Introduction to the major pre-European, colonial, and post-independence aspects of African developments.
- Note:** 200-level and 300-level courses are restricted to juniors, seniors and those lower-division students who have the consent of the instructor.
- \*201. History of Education. 4 hours.** Individual conferences on assigned papers are required. History of education from Antiquity to the Counter-Reformation, in relation to social, political, and religious influences; development of education and educational institutions in the context of factors in European history which affected conceptions of learning and teaching; tensions between different ideals of learning, and their influence upon schools and curricula. Prerequisite: Junior standing or consent of the instructor.



- \*210. The Teaching of History and Related Disciplines.** 4 hours. Introduction to source material and historical literature relevant to the teaching of history and related disciplines in the secondary school; exploration of basic concepts and major themes of historical interpretation. Prerequisite: Junior standing or consent of the instructor.
- \*223. Russia from the Varangians to the Death of Peter the Great.** 4 hours. Individual conferences on assigned papers are required. The Russian people, state, and culture—from their origins to the death of Peter the Great (1725). Prerequisite: One year of European history or consent of the instructor.
- \*224. Russia in the Imperial Age.** 4 hours. Individual conferences on assigned papers are required. Political, diplomatic, intellectual, and social developments in the Russian Empire from the death of Peter the Great to the Revolution of 1905. Prerequisite: One year of European history or consent of the instructor.
- \*225. The Russian Revolution and the New Regime.** 4 hours. Individual conferences on assigned papers are required. Russian and Soviet political, diplomatic, ideological, economic, social, and cultural developments during the Duma period, World War I, the Russian Revolution and war, communism, the NEP, and the Five Year Plan. Prerequisite: One year of European history or consent of the instructor.
- \*226. Afro-American History to the Seventeenth Century.** 4 hours. West African origins of the American black population, the slave trade and seventeenth century slavery. Prerequisite: Junior standing or consent of the instructor.
- \*227. Afro-American History from the Eighteenth Century to the Civil War.** 4 hours. Afro-American slavery, black religion, black leadership, the black role in antislavery movements, the plantation and its way of life. Prerequisite: Junior standing or consent of the instructor.
- \*228. Afro-American History since the Civil War.** 4 hours. The Reconstruction, black institutions and organizations, black labor, varieties of civil rights approaches and leaders thereof. Prerequisite: Junior standing or consent of the instructor.
- \*231. Colonial Latin America.** 4 hours. Individual conferences on assigned papers are required. Iberian discovery, conquest, and settlement of America; the establishment of Spanish and Portuguese institutions; social, economic, political and cultural development in colonial societies from conquest to independence. Prerequisite: Junior standing or consent of the instructor.
- \*232. Latin America in the Nineteenth Century.** 4 hours. Individual conferences on assigned papers are required. The independence of Latin America and

the establishment of the new nations. Prerequisite: Junior standing or consent of the instructor.

- \*233. Modern Latin America. 4 hours.** Individual conferences on assigned papers are required. The Latin American nations in the twentieth century; their social, economic, political, and cultural development and their struggles for modernization. Prerequisite: Junior standing or consent of the instructor.
- \*241. History of Science. 4 hours.** Individual conferences on assigned papers are required. The development of science from its Greek origins to the present in terms of central ideas, such as atomism, evolution, and the relevance of mathematics to physics. Prerequisite: Junior standing or consent of the instructor.
- \*242. History of Science. 4 hours.** Individual conferences on assigned papers are required. Social influences upon the development of science since the Middle Ages: the effect of Puritanism, the French Revolution, and the Second World War on science. Prerequisite: Hist. 241.
- \*243. History of Science. 4 hours.** Individual conferences on assigned papers are required. Great modern contributions to science: Kepler, Newton, Darwin. Prerequisite: Hist. 242.
- \*244. History of China and Japan I. 4 hours.** Individual conferences on assigned papers are required. A survey of East Asian culture and the historical development of economic, social, and political systems in China and Japan, earliest times to 1200 A.D. Prerequisite: Junior standing or consent of the instructor.
- \*245. History of China and Japan II. 4 hours.** Individual conferences on assigned papers are required. A survey of East Asian culture and the historical development of economic, social, and political systems in China and Japan, 1200 to 1850 A.D. Prerequisite: Hist. 244.
- \*246. History of China and Japan III. 4 hours.** Individual conferences on assigned papers are required. A survey of East Asian culture and the historical development of economic, social, and political systems in China and Japan, 1850 to World War II. Prerequisite: Hist. 245.
- \*277. History of Minorities in the United States: Colonial Period through Reconstruction. 4 hours.** Individual conferences on assigned papers are required. History of racial, ethnic, religious, and political minorities in the United States. Prerequisite: Junior standing or consent of the instructor.
- \*278. History of Minorities in the United States: Reconstruction to the Present. 4 hours.** Individual conferences on assigned papers are required. History of racial, ethnic, religious, and political minorities in the United States. Prerequisite: Junior standing or consent of the instructor.

- \*281. The Ancient World: Prehistory and the Ancient Orient. 4 hours.** Individual conferences on assigned papers are required. The evolution of civilization. Ancient civilization prior to the Greeks. Prerequisite: Junior standing or consent of the instructor.
- \*282. The Ancient World: Greece to the Age of Alexander. 4 hours.** Individual conferences on assigned papers are required. The development of Greek civilization from the Helladic to Hellenistic period. Prerequisite: Junior standing or consent of the instructor.
- \*283. The Ancient World: Rome. 4 hours.** Individual conferences on assigned papers are required. The development of Roman civilization from the eighth century B.C. to the fall of the Roman Empire. Prerequisite: Junior standing or consent of the instructor.
- \*297. General Education Colloquium. Topics in European History. 4 hours.** Prerequisite: Junior standing and/or consent of the instructor.
- \*298. General Education Colloquium. Topics in American History. 4 hours.** Prerequisite: Junior standing and/or consent of the instructor.
- \*299. Individual Study: Special Topics. 2 to 5 hours.** May be taken only once for 2 to 5 hours of general education but may be repeated for credit for a maximum of 18 hours. However, without the specific consent of the department, no more than 5 hours in the same quarter may be taken under the direction of the same instructor and no more than a total of 12 hours may be taken in the same quarter. Selected topics in history for individual investigation. Prerequisite: Consent of the instructor.
- \*301. Church and State in Medieval Europe, the Eleventh Through the Twelfth Centuries. 4 hours.** Individual conferences on assigned papers are required. The development of papal centralization from 1049 to 1123, beginning with an examination of the church under feudal domination, the reforms of the Saxon and Salian emperors, and the origins of papal independence are investigated. The basic opposition between imperial and papal assertions of hegemony and the dispute over lay investiture as an aspect of the controversy are the focal points for study of the ecclesiology of Gregory VII and his successors. Prerequisite: Junior standing or consent of the instructor.
- \*302. Byzantine Civilization from 330 to 1054. 4 hours.** Individual conferences on assigned papers are required. The cultural, religious, and social history of the Eastern Roman Empire from the founding of Constantinople to 1054. Special attention to the continuation of classic ideals and Byzantine relations with the Latin West and the Slavic, especially the Russian, worlds. Prerequisite: Junior standing or consent of the instructor.
- \*303. History of Byzantine Civilization from 1054 to 1453. 4 hours.** Individual conferences on assigned papers are required. The cultural, religious, and

social history of the Eastern Roman Empire from 1054 to the fall of Byzantium. Special attention to the continuation of classic ideals and Byzantine relations with the Latin West and the Slavic, especially the Russian, worlds. Prerequisite: Junior standing or consent of the instructor.

- \*304. Intellectual History of the Medieval Western World. 4 hours.** Individual conferences on assigned papers are required. Intellectual and religious thought and learning from the Age of the Fathers to Dante and William of Occam. Some attention is given to cross-cultural relations with the Byzantine and Islamic East. Prerequisite: Junior standing or consent of the instructor.
- \*305. The Middle Ages from 400 to 814. 4 hours.** Individual conferences on assigned papers are required. Europe from the time of the barbarian invasions to the death of Charlemagne. Prerequisite: Junior standing or consent of the instructor.
- \*306. The Middle Ages from 814 to 1250. 4 hours.** Individual conferences on assigned papers are required. Europe from the death of Frederick II. Prerequisite: Junior standing or consent of the instructor.
- \*307. The Middle Ages from 1250 to 1500. 4 hours.** Individual conferences on assigned papers are required. Europe from the rise of the towns to the establishment of national monarchy. Prerequisite: Junior standing or consent of the instructor.
- \*308. The Renaissance. 4 hours.** Individual conferences on assigned papers are required. Major intellectual, cultural, political, social, and economic developments and issues of Renaissance Europe. Prerequisites: Junior standing and one course in history or consent of the instructor.
- \*309. History of Russian Foreign Policy to 1917. 4 hours.** Individual conferences on assigned papers are required. Russian foreign policy from the reign of Peter I to the Revolution. Prerequisite: Junior standing or consent of the instructor.
- \*310. Modern Russian Intellectual and Cultural History. 4 hours.** Individual conferences on assigned papers are required. Development of Russian culture, social and political thought, and philosophy during the eighteenth and nineteenth centuries. Prerequisite: Junior standing or consent of the instructor.
- \*311. The Age of the Reformation. 4 hours.** Individual conferences on assigned papers are required. The Protestant and Catholic reformations of the sixteenth century. Prerequisite: Junior standing or consent of the instructor.
- \*312. The Age of Philip II. 4 hours.** Individual conferences on assigned papers are required. Europe during the second half of the sixteenth century, the



age of Spanish imperialism; religious war and economic expansion. Prerequisite: Junior standing or consent of the instructor.

- \*313. Sixteenth Century Civilization in Europe. 4 hours.** Individual conferences on assigned papers are required. European culture from the generation of Copernicus to the generation of Galileo. Origins of modern thought and ideology in the context of sixteenth century society. Prerequisite: Junior standing or consent of the instructor.
- \*314. Europe in the Seventeenth Century. 4 hours.** Individual conferences on assigned papers are required. Major political, religious, economic, social, and cultural developments and issues. The growth of the French monarchy, the Hapsburg Empire, the Thirty Years' War, the English constitutional crises, international problems and politics, political theory, the scientific revolution, and economic and social problems. Prerequisite: Junior standing or consent of the instructor.
- \*315. Europe in the Eighteenth Century. 4 hours.** Individual conferences on assigned papers are required. Major features of the structure and operations of international relations, diplomacy, and warfare. Economic and political systems of the major states of western Europe from 1715 to 1789. Prerequisite: Junior standing or consent of the instructor.
- \*316. Europe from 1789 to 1848. 4 hours.** Individual conferences on assigned papers are required. The French Revolution; Napoleon and the emergence of a new Europe with the forces of liberalism, nationalism, Romanticism, and conservatism; the meeting of these forces in the revolutions of 1848. Prerequisite: Junior standing or consent of the instructor.
- \*317. Europe from 1848 to 1914: Unification, Power, and Conflict. 4 hours.** Individual conferences on assigned papers are required. The unification of Germany and Italy, the rise of industrialism and the new imperialism, the advent of *Realpolitik* and the background of World War I. Prerequisite: Junior standing or consent of the instructor.
- \*318. Europe from 1914 to the Present. 4 hours.** Individual conferences on assigned papers are required. The contentions among fascism, communism, and liberal democracy to reconstitute Europe after 1918. The background of World War II and Europe in a cold war. Prerequisite: Junior standing or consent of the instructor.
- \*319. European Diplomatic History from 1648 to 1814. 4 hours.** Individual conferences on assigned papers are required. The foreign policy of European states from the Treaty of Westphalia to the fall of Napoleon. Prerequisite: Junior standing or consent of the instructor.
- \*320. European Diplomatic History from 1814 to 1878. 4 hours.** Individual conferences on assigned papers are required. The foreign policy of European



states from the fall of Napoleon to the Congress of Berlin. Prerequisite: Junior standing or consent of the instructor.

- \*321. The Diplomacy of Imperialism from 1878 to the Present. 4 hours.** Individual conferences on assigned papers are required. European relations with the non-European world: late nineteenth century imperialism, the creation, administration, and disintegration of colonial empires, and the emergence of new nations in an age of decolonization. Prerequisite: Junior standing or consent of the instructor.
- \*322. Bourbon France from 1589 to 1685. 4 hours.** Individual conferences on assigned papers are required. The political, social, economic, and intellectual history of France under the Bourbon monarchy to the early years of Louis XIV. Prerequisite: Junior standing with at least 16 hours of history or consent of the instructor.
- \*323. Ideas and Ideologies in Nineteenth Century European Thought. 4 hours.** Individual conferences on assigned papers are required. Major ideas and ideologies from Romanticism to late-century Social Darwinism. Prerequisite: One year of modern European history.
- \*324. Ideas and Ideologies in Twentieth Century Thought. 4 hours.** Individual conferences on assigned papers are required. Important intellectual trends in the modern world; Freudianism and the new science of man, Spenglerian "decline of the West," Marxism-Leninism, the irrationalism of fascism, the post-war existentialist dilemma. Prerequisites: Hist. 323 and one year of European history.
- \*325. Italian History from 1815 to 1870. 4 hours.** Individual conferences on assigned papers are required. The impact of the French Revolution, the *Risorgimento*, the creation of the Italian nation-state, and the early years of the Kingdom of Italy. Prerequisite: Junior standing or consent of the instructor.
- \*326. Italian History from 1870 to the Present. 4 hours.** Individual conferences on assigned papers are required. The development of the Italian national state: the political, social, and economic problems of Italy before World War I, the church-state relationship, colonial ambitions, the fascist corporate state, the Italian Republic since World War II. Prerequisite: Junior standing or consent of the instructor.
- \*327. German History from 1618 to 1740. 4 hours.** Individual conferences on assigned papers are required. The Thirty Years' War: its political, economic, and social effects on German public life. The rise of absolutism, the decline of the *Reich*, economic reconstruction and cameralism, the changing structure of social relationships. Prerequisite: Junior standing or consent of the instructor.

- \*328. German History from 1740 to 1848. 4 hours.** Individual conferences on assigned papers are required. The rise of Prussia and Austro-Prussian dualism; enlightened absolutism in Germany; Germany in the revolutionary period; the rise of political ideologies and middle-class culture; the revolutions of 1848. Prerequisite: Junior standing or consent of the instructor.
- \*329. Modern Germany from 1848 to the Present. 4 hours.** Individual conferences on assigned papers are required. Germany's political, economic, and social reaction to the problems of national unification, industrialism, liberalism, world-power status and rejuvenation after the loss of that status in the two World Wars. Prerequisites: Junior standing and one year of European history or consent of the instructor.
- \*330. History of European Economic Life: 1500 to 1750. 4 hours.** Individual conferences on assigned papers are required. The breakup of traditional European societies and the emergence of preindustrial capitalist forms in the Western world before the Industrial Revolution. Prerequisite: Junior standing or consent of the instructor.
- \*331. History of European Economic Life: 1750 to 1870. 4 hours.** Individual conferences on assigned papers are required. The creation of an industrial society in Britain and its diffusion to western Europe. Prerequisite: Junior standing or consent of the instructor.
- \*332. History of European Economic Life: Since 1870. 4 hours.** Individual conferences on assigned papers are required. The continuing spread of industrial society throughout Europe since the climacteric of the 1870's; problems of mature capitalist societies; the emergence of a postindustrial economic order. Prerequisite: Junior standing or consent of the instructor.
- \*333. History of East Central Europe since 1526. 4 hours.** Individual conferences on assigned papers are required. The political, social, economic, and cultural development of Austria, Hungary, Poland, and the Czechoslovak lands from the Battle of Mohacs to the present. Prerequisite: Junior standing or consent of the instructor.
- \*334. Colonial Mexico. 4 hours.** Individual conferences on assigned papers are required. The Indian background of Mexico, the Spanish conquest, the amalgamation of Spanish and indigenous cultures, and the evolution of Mexican economic, religious, social and political institutions under Spanish domination until 1821. Prerequisite: Junior standing or consent of the instructor.
- \*335. The Mexican Nation from 1821 to 1910. 4 hours.** Individual conferences on assigned papers are required. The social, economic, political, and cultural development of Mexico from independence to the fall of Porfirio Diaz. Prerequisite: Junior standing or consent of the instructor.

- \*336. Mexico since 1910. 4 hours.** Individual conferences on assigned papers are required. The Mexican Revolution and the development of the modern nation. Prerequisite: Junior standing or consent of the instructor.
- \*337. Tudor England from 1485 to 1603. 4 hours.** Individual conferences on assigned papers are required. Major political, constitutional, social, economic, and cultural developments and issues of Tudor England. Prerequisite: Junior standing or consent of the instructor.
- \*338. Stuart England from 1603 to 1714. 4 hours.** Individual conferences on assigned papers are required. Major political, constitutional, social, economic, and cultural developments and issues of Stuart England. Prerequisite: Junior standing or consent of the instructor.
- \*339. Eighteenth Century England from 1714 to 1815. 4 hours.** Individual conferences on assigned papers are required. From the accession of the Hanoverian to the end of the Napoleonic Wars. Prerequisite: Junior standing or consent of the instructor.
- \*340. Nineteenth Century England from 1815 to 1886. 4 hours.** Individual conferences on assigned papers are required. From the end of the Napoleonic Wars to the Home Rule election. Prerequisite: Junior standing or consent of the instructor.
- \*341. Twentieth Century England from 1886 to the Present. 4 hours.** Individual conferences on assigned papers are required. From the Home Rule election to the present. Prerequisite: Junior standing or consent of the instructor.
- \*342. Social and Economic Development of Modern Britain. 4 hours.** Individual conferences on assigned papers are required. British economic developments since the Industrial Revolution; social and political response to industrial society; the rise of the Labour Party and the welfare state. Prerequisite: Hist. 133 or consent of the instructor.
- \*343. English Constitutional History to 1485. 4 hours.** Individual conferences on assigned papers are required. The foundation and development of British constitutional, political, and legal institutions from Anglo-Saxon times to the accession of the Tudor dynasty. Prerequisite: One year of British history or one year of medieval history or consent of the instructor.
- \*344. English Constitutional History from 1485 to the Present. 4 hours.** Individual conferences on assigned papers are required. Growth, development, and change in British constitutional, political, legal, and imperial institutions from the accession of the Tudor dynasty to the present. Prerequisite: One year of British history or one year of modern European history or consent of the instructor.
- \*345. History of Western Africa and the Sudan. 4 hours.** Individual conferences on assigned papers are required. Development of native African states from

earliest times; the impact of European and other alien influences on the continent; emergence of the modern independent African states. Prerequisite: Junior standing or consent of the instructor.

- \*346. Eastern Africa and the Horn. 4 hours.** Individual conferences on assigned papers are required. Development of native African states from earliest times; the impact of European and other alien influences on the continent; emergence of the modern independent African states. Prerequisite: Junior standing or consent of the instructor.
- \*347. Southern Africa and the Congo. 4 hours.** Individual conferences on assigned papers are required. Development of native African states from earliest times; the impact of European and other alien influences on the continent; emergence of the modern independent African states. Prerequisite: Junior standing or consent of the instructor.
- \*348. The Portuguese Empire in Brazil. 4 hours.** Individual conferences on assigned papers are required. Portuguese discovery, settlements and exploitation of Brazil during three centuries; creation of the Brazilian nation through an amalgamation of races and cultures in a plantation and mining economy. Prerequisite: Junior standing or consent of the instructor.
- \*349. Monarchy in Brazil from 1808 to 1889. 4 hours.** Individual conferences on assigned papers are required. The foundation of Brazilian independence; the consolidation of the nation; its economic, social, political, and intellectual development. Prerequisite: Junior standing or consent of the instructor.
- \*350. Modern Brazil from 1889 to the Present. 4 hours.** Individual conferences on assigned papers are required. The Conservative republic, the revolution of 1930, the Vargas era, economic, social, and cultural development, and the struggle for modernization. Prerequisite: Junior standing or consent of the instructor.
- \*351. Discovery and Settlement of the Americas in the Sixteenth and Seventeenth Centuries. 4 hours.** Individual conferences on assigned papers are required. Development of the Americas; early phases of European interests in the Atlantic Community; the first century of British North America. Prerequisite: Junior standing or consent of the instructor.
- \*352. British North America from 1690 to 1765. 4 hours.** Individual conferences on assigned papers are required. The duel with France for empire; development of British North America to the eve of American independence. Prerequisite: Junior standing or consent of the instructor.
- \*353. Development of the American Nation from 1765 to 1801. 4 hours.** Individual conferences on assigned papers are required. The background for independence; the American Revolution; establishment of government. Prerequisite: Junior standing or consent of the instructor.



- \*354. The New Nation: The United States from 1789 to 1828. 4 hours.** Individual conferences on assigned papers are required. Establishment of the American nation under the Constitution. Emergence of the party system; westward expansion; the growth of nationalism and sectionalism. Prerequisite: Junior standing or consent of the instructor.
- \*355. Jacksonian Politics: 1828 to 1840. 4 hours.** Individual conferences on assigned papers are required. Analysis of political developments and changes during the administrations of Andrew Jackson and Martin Van Buren. Prerequisite: Junior standing or consent of the instructor.
- \*356. Expansion and Conflict: The United States from 1848 to 1865. 4 hours.** Individual conferences on assigned papers are required. Causes and events leading to the Civil War; Lincoln and the War. Prerequisite: Junior standing or consent of the instructor.
- \*357. The Politics of Reform in Industrial America from 1877 to 1912. 4 hours.** Individual conferences on assigned papers are required. Agrarian protest, organization of labor, third-party movements, and progressivism in the period of rapid social and economic change at the turn of the century. Prerequisite: Junior standing or consent of the instructor.
- \*358. Response to Crisis: Twentieth Century America in War and Depression from 1912 to 1939. 4 hours.** Individual conferences on assigned papers are required. The American response to World War I and the depression of the 1930's. Analysis of political, social, economic, and intellectual tendencies. Prerequisite: Junior standing or consent of the instructor.
- \*359. Studies in Contemporary American History: The United States from 1939 to the Present. 4 hours.** Individual conferences on assigned papers are required. World War II, postwar diplomacy, political, social, economic, and intellectual tendencies. Prerequisite: Junior standing or consent of the instructor.
- \*360. Reconstruction: The United States from 1865 to 1877. 4 hours.** Individual conferences on assigned papers are required. Reconstruction of the Union following the Civil War. Prerequisite: Junior standing or consent of the instructor.
- \*361. The Land and the Nation. 4 hours.** Individual conferences on assigned papers are required. Analysis of the influence of public domains on American development, from colonial times to the Civil War. Emphasis on political, institutional, constitutional, and ideological topics. Prerequisite: Junior standing or consent of the instructor.
- \*362. The United States and Its Natural Heritage. 4 hours.** Individual conferences on assigned papers are required. Analysis of the contest that developed after 1865 for the control and utilization of America's natural



resources. Emphasis on political, institutional, economic, social, and ideological topics. Prerequisite: Junior standing or consent of the instructor.

**\*363. American Intellectual and Social Thought from 1600 to 1830. 4 hours.** Individual conferences on assigned papers are required. Representative cultural statements for American Puritanism, the Enlightenment, Romanticism, and Pragmatism. Prerequisite: Junior standing or consent of the instructor.

**\*364. American Intellectual and Social Thought from 1831 to 1890. 4 hours.** Individual conferences on assigned papers are required. Representative cultural statements from American Puritanism, the Enlightenment, Romanticism, and Pragmatism. Prerequisite: Junior standing or consent of the instructor.

**\*\*365. Development of the American Economy from 1607 to 1815. 4 hours.** Individual conferences on assigned papers are required. Analysis of the main currents and factors in the economic development of the United States from colonial times to the War of 1812. Special attention to the relationship of economic institutions and activities to social and political trends in American civilization. Prerequisite: Junior standing or consent of the instructor.

**\*\*366. Development of the American Economy from 1815 to 1917. 4 hours.** Individual conferences on assigned papers are required. Analysis of the main currents and factors in the economic development of the United States from the War of 1812 to World War I. Special attention to the relationship of economic institutions and activities to social and political trends in American civilization. Prerequisite: Junior standing or consent of the instructor.

**\*367. The Diplomatic History of the United States from 1775 to 1880. 4 hours.** Individual conferences on assigned papers are required. Development of American relationships in the New World and with the nations of Europe and Asia. Prerequisite: Junior standing or consent of the instructor.

**\*368. The Diplomatic History of the United States from 1880 to the Present. 4 hours.** Individual conferences on assigned papers are required. Emergence of the United States as a world power. Prerequisite: Junior standing or consent of the instructor.

**\*369. Constitutional Development of the United States to 1840. 4 hours.** Individual conferences on assigned papers are required. Prerequisite: One year of United States history or British history or political science.

**\*370. Constitutional Development of the United States from 1840 to 1900. 4 hours.** Individual conferences on assigned papers are required. Prerequisite: One year of United States history or British history or political science.

- \*371. Constitutional Development of the United States in the Twentieth Century. 4 hours.** Individual conferences on assigned papers are required. Prerequisites: One year of United States history, British history, or political science and junior standing or consent of the instructor.
- \*\*372. Development of the American Economy from 1917 to the Present. 4 hours.** Individual conferences on assigned papers are required. Analysis of the main currents and factors in the economic development of the United States since World War I. Special attention to the relationship of economic institutions and activities to social and political trends in American civilization. Prerequisite: Junior standing or consent of the instructor.
- \*373. American Urban History: The Colonial Period to the 1860's. 4 hours.** Individual conferences on assigned papers are required. The major causes for and consequences of the emergence of American cities from the seventeenth century to the Civil War. Prerequisite: One year of introductory American history or consent of the instructor.
- \*374. American Urban History: The 1860's to the Present. 4 hours.** Individual conferences on assigned papers are required. The major causes for and consequences of the emergence of the industrialized city: industrial revolution, labor movement, architectural revolution, ethnic groups, housing, health, social reform, and others. Prerequisite: One year of introductory American history or consent of the instructor.
- \*375. Studies in American Urban History. 4 hours.** Individual conferences on assigned papers are required. Individual training in research in urban history and discussion of selected major problems of American urbanization. Prerequisite: Hist. 373 and 374 or consent of the instructor.
- \*376. American Intellectual and Social Thought from 1891 to the Present. 4 hours.** Individual conferences on assigned papers are required. Representative cultural statements from American Puritanism, the Enlightenment, Romanticism, and Pragmatism. Prerequisite: Junior standing or consent of the instructor.
- \*377. Race and Ethnicity in American Life to the Civil War. 4 hours.** Individual conferences on assigned papers are required. History of race relations and attitudes; special emphasis on comparative study of varieties of peoples and the manner in which race and pluralism created issues of material importance. Prerequisite: One year of introductory American history or political science or sociology, or consent of the instructor.
- \*378. Race and Ethnicity in American Life since the Civil War. 4 hours.** Individual conferences on assigned papers are required. History of race relations and attitudes; special emphasis on comparative study of varieties of peoples and the manner in which race and pluralism created issues of material importance. Prerequisite: One year of introductory American history or political science or sociology, or consent of the instructor.

- \*379. Studies in American Racial and Ethnic History. 4 hours.** Seminar; emphasizes original research in selected topics of American racial and ethnic history. Prerequisites: Hist. 377 and 378 or consent of the instructor.
- \*380. Bourbon France from 1685 to 1789. 4 hours.** Individual conferences on assigned papers are required. The political, social, economic, and intellectual history of France under the Bourbon monarchy from the reign of Louis XIV to the Revolution. Prerequisite: Hist. 322 or consent of the instructor.
- \*381. Greek History from 750 to 478 B.C. 4 hours.** Individual conferences on assigned papers are required. The political, social, and economic development of Greece from the end of the Dark Ages to the defeat of the Persian invader. Prerequisites: Junior standing and Hist. 282 or consent of the instructor.
- \*382. Greek History from 478 to 336 B.C. 4 hours.** Individual conferences on assigned papers are required. The political, social, and economic development of Greece from the end of the Persian Wars to the Macedonian conquest. Prerequisites: Junior standing and Hist. 282, or consent of the instructor.
- \*383. The Roman Revolution from 146 to 30 B.C. 4 hours.** Individual conferences on assigned papers are required. The political, social, and economic history of Rome from the Gracchan crisis to the end of the Republic. Prerequisites: Junior standing and Hist. 283 or consent of the instructor.
- \*384. The Roman Empire, the Second Through the Sixth Centuries, A.D. 4 hours.** Individual conferences on assigned papers are required. The Roman Empire as a bridge between antiquity and medieval civilization. Decay of imperial institutions as a result of social tensions and economic problems and attempts at imperial reform. Christianity in the empire and the rise of the papacy. The Germanic invasions and the establishment of the western kingdoms. Prerequisite: Junior standing or consent of the instructor.
- \*385. European Intellectual History: the Seventeenth Century. 4 hours.** Individual conferences on assigned papers are required. The beginnings of the scientific revolution and its effect on the cosmology, theology, and philosophy of the Middle Ages. The Counter-Reformation, Jansenists and Jesuits. Political theory, absolutism, natural law, republicanism. The battle of the ancients and moderns. Classicism and Baroque. Mysticism and the great philosophical systems. Prerequisite: Junior standing or consent of the instructor.
- \*386. European Intellectual History: The Age of Criticism (1680 to 1750). 4 hours.** Individual conferences on assigned papers are required. The Newtonian synthesis and its impact on the eighteenth century. The attack on author-

ity, Bayle, Vico, Locke, the English Deists. The growth of scepticism, David Hume. The formation of Enlightenment philosophy. Montesquieu, Voltaire, and the first **philosophes**. Scientific academies, the salons, and the development of liberalism. Prerequisite: Junior standing or consent of the instructor.

- \*387. European Intellectual History: the High Enlightenment (1750 to 1799).** 4 hours. Individual conferences on assigned papers are required. The Enlightenment synthesis. The problem of the Enlightenment. Materialism, mechanism, egoism, fatalism. The **Encyclopedia**. Liberalism and the crusade against social injustice. Rousseau and the revolt against the Enlightenment. Primitivism, sentiment, and the beginnings of Romanticism. The Enlightenment in Germany. The impact of the Enlightenment on the French Revolution. Prerequisite: Hist. 386 or consent of the instructor.
- \*388. Greek and Roman Historiography.** 4 hours. Individual conferences on assigned papers are required. Analysis of the most important historians of classical antiquity, including their backgrounds, motives, interests, techniques, prejudices, and philosophies of history. Prerequisites: Junior standing and Hist. 282 or 283, or consent of the instructor.
- \*389. The American Historians from 1607 to 1876.** 4 hours. Individual conferences on assigned papers are required. Major American historians; analysis of their works as expressions of American culture. Emphasis on the role of history in American life and thought. Prerequisite: Junior standing or consent of the instructor.
- \*390. Proseminar in American History.** 4 hours. May be repeated for credit. Individual conferences on assigned papers are required. Prerequisite: Consent of the instructor.
- \*391. American Historians from 1877 to the Present.** 4 hours. Individual conferences on assigned papers are required. Major American historians; analysis of their works as expressions of American culture. Emphasis on the role of history in American life and thought. Prerequisite: Junior standing or consent of the instructor.
- \*392. Proseminar in Modern European History.** 4 hours. May be repeated for credit. Individual conferences on assigned papers are required. Selected topics for special study. Prerequisite: Consent of the instructor.
- \*393. Proseminar in East European History.** 4 hours. May be repeated for credit. Individual conferences on assigned papers are required. Selected topics for special study. Prerequisite: Consent of the instructor.
- \*394. Proseminar in English History.** 4 hours. May be repeated for credit. Individual conferences on assigned papers are required. Selected topics for special study. Prerequisite: Consent of the instructor.



- \*395. Proseminar in Medieval History. 4 hours.** May be repeated for credit. Individual conferences on assigned papers are required. Selected topics for special study. Prerequisite: Consent of the instructor.
- \*396. Proseminar in Russian History. 4 hours.** May be repeated for credit. Individual conferences on assigned papers are required. Selected topics for special study. Prerequisite: Consent of the instructor.
- \*397. Development of Modern France from 1815 to 1914. 4 hours.** Individual conferences on assigned papers are required. Investigation into the major political and socioeconomic forces at work in French history from the fall of Napoleon to World War I. The uniqueness and the universality of the French experience are stressed. Prerequisite: Junior standing or consent of the instructor.
- \*398. Development of Modern France from 1914 to the Present. 4 hours.** Individual conferences on assigned papers are required. Investigation into the major political and socioeconomic forces at work in French history from World War I, to General Charles de Gaulle's Fifth Republic. The uniqueness and the universality of the French experience are stressed. Prerequisite: Junior standing or consent of the instructor.
- \*399. Topics in Modern French History. 4 hours.** Individual conferences on assigned papers are required. A thematic approach to the major political, social, and economic forces in modern French history; Revolution; the classes and the masses; Marxism; the military; bureaucracy; technocracy; political parties and ideologies; Gaullism. Prerequisite: Junior standing or consent of the instructor.

## HISTORY OF ARCHITECTURE AND ART (HAA)

Asterisks (\*) indicate general education credit in humanities.

- \*115. Introduction to Art History. 4 hours.** Introduction to the hypotheses of art. Visual and stylistic analysis; study of iconology; sociology of art, economics of art; criticism; the artist's role in history. (Formerly Art 115)
- \*142. History of Architecture and Art I. 4 hours.** Form and meaning in architecture, sculpture, painting, and the allied arts from antiquity through the medieval era. (Formerly A&A 142)
- \*143. History of Architecture and Art II. 4 hours.** Form and meaning in architecture, sculpture, painting, and the allied arts from the early Renaissance through the late Baroque era. Prerequisite: HAA 115 or 142 (Formerly A&A 143)



- \*144. History of Architecture and Art III. 4 hours.** Form and meaning in architecture, sculpture, painting, and the allied arts from neoclassicism through the modern era. Prerequisite: HAA 115 or 143. (Formerly A&A 144)
- \*201. Prehistoric Art. 4 hours.** The art and artifacts of the Paleolithic and Neolithic peoples of Europe and Asia. Prerequisite: HAA 115 or 142 or consent of the instructor. (Formerly AH 205)
- \*211. Art and Archaeology of the Ancient Near East. 4 hours.** The development of painting, sculpture, and allied arts in Egypt, western Asia, and the Aegean from the beginning of the Bronze Age to the end of the second millennium B.C. Prerequisite: HAA 115 or 142 or consent of the instructor. (Formerly AH 217)
- \*212. Greek Art and Archaeology. 4 hours.** The development of painting, sculpture, and the allied arts of Greece from the end of the Bronze Age through the Hellenistic period. Prerequisite: HAA 115 or 142 or consent of the instructor. (Formerly AH 218)
- \*213. Roman Art and Archaeology. 4 hours.** Painting, sculpture, and the allied arts of ancient Italy; special emphasis on the development of the Roman civilization. Prerequisite: HAA 115 or consent of the instructor. (Formerly AH 219)
- \*221. Early Christian and Byzantine Art. 4 hours.** The art and architecture of the Latin West and the Greek East from the Age of Constantine through the First Golden Age of Byzantine Art under Justinian. Prerequisite: HAA 115 or 142 or consent of the instructor. (Formerly AH 211)
- \*222. Early Medieval Art. 4 hours.** The art and architecture of western Europe from the Dark Ages through the early Romanesque; special attention to the Carolingian and Ottonian revivals of antiquity. Prerequisite: HAA 115 or 142 or consent of the instructor. (Formerly AH 212)
- \*223. Medieval Art, 1100 to 1400. 4 hours.** Art and architecture of the mature Romanesque through the High Gothic age. Prerequisite: HAA 115 or 142 or consent of the instructor. (Formerly AH 213)
- \*231. Ancient Architecture. 4 hours.** The development of the architecture of the ancient Near East, Greece, and Rome. Prerequisite: HAA 115 or 142 or consent of the instructor. (Formerly Arch. 231)
- \*232. Medieval Architecture. 4 hours.** The development of early Christian, Byzantine, Romanesque, and Gothic architecture. Prerequisite: HAA 115 or 144 or consent of the instructor. (Formerly Arch. 232)
- \*233. Renaissance and Baroque Architecture. 4 hours.** The development of European architecture from 1400 to 1750. Prerequisite: HAA 115 or 144 or consent of the instructor. (Formerly Arch. 233)

- \*234. American Architecture. 4 hours.** The development of architecture in colonial America and the United States from 1600 to 1900. Prerequisite: HAA 115 or 144 or consent of the instructor. (Formerly Arch. 234)
- \*235. European Architecture, 1750 to 1900. 4 hours.** Romantic Classicism and Gothic Revival in England, France and Germany. Other revival styles and Art Nouveau. Building in iron and concrete. Prerequisite: HAA 115 or 144 or consent of the instructor. (Formerly Arch. 235)
- \*236. Twentieth Century Architecture. 4 hours.** The development of architecture in Europe and the United States from 1900 to the present. Prerequisite: HAA 115 or 144 or consent of the instructor. (Formerly Arch. 236)
- \*237. Japanese Architecture. 4 hours.** Religious, domestic, and landscape architecture of Japan. Prerequisite: HAA 115 or 144 or consent of the instructor. (Formerly Arch. 237)
- \*238. Pre-Columbian Architecture. 4 hours.** Architecture of North, Central, and South America before 1500. Prerequisite: HAA 115 or 144 or consent of the instructor. (Formerly Arch. 238)
- \*241. Art of the Renaissance in Italy. 4 hours.** Painting, sculpture, and architecture of the fifteenth and sixteenth centuries. Prerequisite: HAA 115 or 143 or consent of the instructor.
- \*242. Art of the Renaissance in Northern Europe. 4 hours.** The art of the Lowlands, France, Germany, and England; emphasis on illuminated manuscripts, panel painting, and the work of Van Eyck, Van der Weyden, Bosch, Lochner, Durer, and the School of Fontainebleau. Prerequisite: HAA 115 or 143 or consent of the instructor. (Formerly AH 214)
- \*251. Art of the Baroque. 4 hours.** Painting, sculpture, and the allied arts from the seventeenth through the mid-eighteenth centuries; emphasis on the work of Bernini, Rubens, Rembrandt, and Velasquez. Prerequisite: HAA 115 or 144 or consent of the instructor. (Formerly AH 207)
- \*261. Art of the Nineteenth Century. 4 hours.** Painting, sculpture, and the allied arts in western Europe and the United States. Prerequisite: HAA 115 or 144 or consent of the instructor. (Formerly AH 208)
- \*262. Art of the Twentieth Century. 4 hours.** Painting, sculpture, and the allied arts in western Europe and the United States. Prerequisite: HAA 115 or 144 or consent of the instructor. (Formerly AH 209)
- \*271. Art of China. 4 hours.** A survey of Chinese painting, sculpture, and related arts from Neolithic times to the eighteenth century. Prerequisite: HAA 115 or 144 or consent of the instructor. (Formerly AH 220)

- \*272. Art of Japan. 4 hours.** A survey of Japanese architecture, sculpture, painting, woodcuts, and related arts from prehistoric times to the nineteenth century. Prerequisite: HAA 115 or 144 or consent of the instructor. (Formerly AH 221)
- \*273. Art of India and Southeast Asia. 4 hours.** A survey of architecture, sculpture, and painting from the Indus Valley civilization to the Mughal period. Prerequisite: HAA 115 or 144 or consent of the instructor. (Formerly AH 222)
- \*280. History of Industrial Design. 4 hours.** Materials, techniques and products from antiquity to the present; production methods; the role of the designer in industry and society. Prerequisite: 3 hours from HAA or consent of the instructor.
- \*281. Art in America to 1860. 4 hours.** Painting, sculpture and the significant handicrafts from Colonial America through the mid-nineteenth century United States. Emphasis on portraiture, historical painting, and the romantic landscape. Prerequisite: HAA 115 or 144 or consent of the instructor. (Formerly AH 210)
- \*282. Art in America from 1860 to 1945. 4 hours.** Painting, sculpture and the decorative arts from the mid-nineteenth century through World War II. The emergence of an American art consciousness and progress toward international leadership. Prerequisite: HAA 115 or 144 or consent of the instructor.
- 284. History of Photography. 4 hours.** Technological and artistic development. Prerequisite: Sophomore standing or consent of the instructor.
- 285. History of the Film I. 4 hours.** From the beginnings in the 1890's to the establishment of the talking picture in the early 1930's. Prerequisite: Sophomore standing or consent of the instructor.
- 286. History of the Film II. 4 hours.** From the establishment of sound and the genres of the 1930's to the present. Prerequisite: Sophomore standing or consent of the instructor.
- \*291. Art History Tutorial. 4 hours.** The methodology and philosophies of art history. Application to selected problems in the field. Readings, discussions, and reports. Prerequisites: Junior standing and 12 hours of history of architecture and art at the 200 and 300 level. (Formerly AH 215)
- 331. Seminar in Architectural History.** Selected problems in the history of architecture. Prior to registration the student should be advised by the instructor. Prerequisite: 12 hours from HAA 231 through 238 or consent of the instructor. (Formerly Arch. 331)

332. **Readings in History of Architecture.** 4 hours. Individually planned readings on selected topics under the supervision of a faculty member. Prior to registration the student should be advised by the instructor. Prerequisite: 12 hours from HAA 231 through 238. (Formerly Arch. 332)
333. **Literature, Theory, and Criticism.** 4 hours. Selected readings and discussion of significant writers on architecture. Prior to registration the student should be advised by the instructor. Prerequisite: 12 hours from HAA 231 through 238. (Formerly Arch. 333)
334. **Chicago Building.** 4 hours. Architectural and technical history of Chicago's commercial buildings from 1871 to the present. Prerequisite: 12 hours from HAA 231 through 238. (Formerly Arch. 334)
335. **Wright and His Contemporaries, 1890 to 1910.** 4 hours. Frank Lloyd Wright's domestic buildings in the Chicago area and his relationship to other members of the "Prairie School" of Midwest architecture. Lectures, discussions, and field trips. Prerequisite: 12 hours from HAA 231 through 238. (Formerly Arch. 335)
336. **Seminar: Adler and Sullivan.** 4 hours. A critical study of Chicago's foremost architectural partnership: monuments, theories, and practice. Prerequisites: 12 hours from HAA 231 through 238 and HAA 334. (Formerly Arch. 336)
341. **Art of the Fifteenth Century in Florence.** 4 hours. Stylistic and iconographic studies of works of the major painters, sculptors, and architects. Florentine history and literature will be considered in their relation to the visual arts. Prerequisites: Junior standing and 4 hours from HAA 200-level courses.
342. **Art of the High Renaissance.** 4 hours. Art of the great Italian centers during the late fifteenth and early sixteenth centuries. Emphasis on Leonardo, Raphael, Bramante, Bellini, Giorgione, and Michelangelo. Prerequisites: Junior standing and 4 hours from HAA 200-level courses.
361. **Proseminar in Modern Painting.** 4 hours. May be repeated for credit at the discretion of the department. Selected examples; development and diffusion of style and iconography. Analogies in the history of ideas and events, technical change, and other pertinent material. Prerequisites: Junior standing and 4 hours from HAA 200-level courses. (Formerly AH 302)
362. **Proseminar in Modern Sculpture.** 4 hours. May be repeated for credit at the discretion of the department. Study of selected examples; development and diffusion of style and iconography. Analogies in the history of ideas and events, technical change, and other pertinent material. Prerequisites:

Junior standing and 4 hours from HAA 200-level courses. (Formerly AH 303)

363. **Contemporary Art. 4 hours.** The most recent developments in contemporary art, its theories and production. Prerequisites: Junior standing and 4 hours from HAA 200-level courses. (Formerly AH 307)
391. **Special Studies in History of Art. 4 hours.** May be repeated for a maximum of 12 hours. Discussions of special problems, with attention to a major theme, period, or artist. Student reports are required. Prerequisites: Senior standing and 12 hours from HAA 200 and 300-level courses or consent of the instructor. (Formerly AH 305)
392. **Readings in Art History. 4 hours.** May be repeated for credit at the discretion of the department. Individually planned readings on selected topics under supervision of a faculty member. Prior to registration the student should be advised by the instructor. Prerequisites: Senior standing and 12 hours from HAA 200 and 300-level courses. (Formerly AH 306)

## HUMANITIES (Hum)

Asterisks (\*) indicate general education credit in humanities.

- \*101. **World Literature I: The Ancient World. 4 hours.** Masterpieces of world literature from earliest times to the present, in English and in English translation. **W, S, Su, F**
- \*102. **World Literature II: The World of the Middle Ages and the Renaissance. 4 hours.** Continues Humanities 101. **W, S, Su, F**
- \*103. **World Literature III: The Modern World from 1700 to the Present. 4 hours.** Continues Humanities 102. **W, S, Su, F**
- \*151. **The Heritage of Western Culture I. 4 hours.** The tragedy of the human condition. Prerequisite: Sophomore standing. **F**
- \*152. **The Heritage of Western Culture II. 4 hours.** The individual and the state. Prerequisite: Sophomore standing. **W**
- \*153. **The Heritage of Western Culture III. 4 hours.** The effect of the conflict between Judaeo-Christian and Greek classical influences on our cultural patterns. Prerequisite: Sophomore standing. **S**
201. **Classic Literature of the Orient. 4 hours.** Introduction to the thought of



the Orient through readings in Islamic, Indian, Chinese, and Japanese literary classics. Prerequisite: Junior standing or consent of the instructor. S

235. **Studies in Existentialist Literature. 4 hours.** Same as Philosophy 235. Imaginative works by Dostoevsky, Rilke, Kafka, Sartre, and Camus; selections from Pascal, Kierkegaard, Nietzsche, Jaspers, and Tillich. Prerequisite: Junior standing or consent of the instructor.
253. **The English Bible I: The Old Testament. 4 hours.** Same as English 253. An historical and analytical study of the Old Testament portion of the English Bible, concentrating on the King James version and taking note of more recent revisions of that version. Prerequisite: Junior standing or consent of the instructor.
254. **The English Bible II: The Apocrypha and the New Testament. 4 hours.** Same as English 254. An historical and analytical study of the Apocrypha and New Testament portions of the English Bible, concentrating on the King James version and taking note of more recent revisions of that version. Prerequisite: Junior standing or consent of the instructor.
287. **Forms of Modern Fiction. 4 hours.** Same as English 287. Major trends in the development of modern fiction from Flaubert to Faulkner. Prerequisite: Junior standing or consent of the instructor.
289. **New Perceptions in Visual Arts, Music, and Science. 4 hours.** Same as Music 289. The extended sensory range of the twentieth century as represented in the visual arts, music, and science. Prerequisite: Sophomore standing.

## INFORMATION ENGINEERING (InfE)

100. **General Biology. 4 hours.** Same as Biological Sciences 100. With Information Engineering 101 and 102, a three-quarter sequence which may be entered in any quarter. Audio-tutorial. Principles and fundamentals of biology through examination of diverse phenomena unique to biological systems. Lecture, laboratory, and discussion.
101. **General Biology. 4 hours.** Same as Biological Sciences 101. Continues Information Engineering 100.
102. **General Biology. 4 hours.** Same as Biological Sciences 102. Continues Information Engineering 101.
120. **Introduction to Electricity and Magnetism. 4 hours.** Essential elements of basic electricity and magnetism as summarized by Maxwell's equations in vector integral form. Prerequisite: Math. 133.

200. **Introduction to Bioengineering.** 4 hours. Fundamental aspects of some engineering problems presented by man, his society, his environment, and his interaction with machines. Topics indicate how engineering analysis may be applied to help solve some complex biological problems. Prerequisites: Math. 133 and Phys. 133, or the equivalents.
201. **History of Engineering.** 4 hours. The important elements in the growth of the art and science of engineering from ancient times to the present. Lives of some of the leaders. The effect of engineering on the social conditions of the various periods. Prerequisite: Junior standing or consent of the instructor.
210. **Introduction to Circuit Analysis.** 5 hours. Introductory treatment of electrical network theory; equilibrium equations, exponential signals and linear differential equations, initial conditions, forced responses, node and loop methods, network theorems, power and energy. Laboratory experiments, including analog computer. Prerequisites: InfE. 120 or Phys. 113 and credit or registration in Math. 220.
212. **Signal Processing.** 4 hours. Exponential excitations and responses; signal representation in terms of Fourier series, Fourier transforms, bilateral and unilateral Laplace transforms; applications. Prerequisite: InfE. 210.
219. **Introduction to Electromagnetic Fields.** 4 hours. Elements of vector calculus; static electric and magnetic fields; elementary electromagnetic theory as summarized in Maxwell's equations in integral and differential form. Prerequisites: Phys. 113 or InfE. 120 and credit or registration in Math. 220.
221. **Introductory Electromagnetic Field Theory.** 3 hours. Maxwell's equations in integral and differential form; static electric and magnetic fields; wave motion and introduction to radiation. Prerequisite: InfE. 210 and 219.
240. **Introduction to Electronics.** 4 hours. Physical characteristics of high vacuum electron tubes, gaseous conduction and gas tubes, semiconductors, and transistors; tube and transistor characteristics and equivalent circuits; introduction to methods of analysis. Prerequisite: InfE. 210 or the equivalent.
280. **Vertebrate Morphogenesis.** 5 hours. Same as Biological Sciences 280. An introduction to vertebrate anatomy with emphasis on early embryology and histology. Lecture and laboratory. Prerequisite: One year of biological sciences.
281. **Structure and Development of Vertebrates I.** 5 hours. Same as Biological Sciences 281. With Information Engineering 282 a two-quarter sequence. Evolution of vertebrate organ systems; their embryogenesis and microscopic and gross anatomy. Lecture and laboratory. Prerequisite: InfE. 280.

282. **Structure and Development of Vertebrates II.** 5 hours. Same as Biological Sciences 282. Continues Information Engineering 281. Prerequisite: InfE. 281.
283. **General Genetics.** 5 hours. Same as Biological Sciences 240. Principles of heredity and variation illustrating the gene concept. Examples include animal, plant, microorganism, and human heredity. Lecture and laboratory. Prerequisite: One year of biological sciences. Math. 104, 105, 130, and organic chemistry are recommended.
284. **Cellular Biodynamics.** 5 hours. Same as Biological Sciences 261. The basic physiological activities common to cells; study of the functions characteristic of specialized cell types. Lecture and laboratory. Prerequisites: One year of biological sciences and Chem. 134 or 234.
292. **Undergraduate Research.** 2 to 4 hours. Research under the close supervision of a faculty member. Prerequisite: Consent of the instructor.
311. **Linear Systems Analysis.** 4 hours. Application of signal representations discussed in Information Engineering 212 to the analysis of linear systems; transform methods and frequency analysis; natural response, stability, signal flow graphs; Laplace transform with two variables; convolution integral and applications. Prerequisite: InfE. 212.
312. **Introduction to Communication Engineering.** 4 hours. Introduction to communication systems; amplitude, frequency, and pulse-type modulation; correlation and correlation functions; noise and noise calculations; channel capacity and bandwidth-signal to noise ratio applications. Prerequisites: InfE. 311 and 340.
315. **Intermediate Network Analysis.** 4 hours. Laplace transform analysis of networks; impedance and admittance function, network theorems; network functions; one and two port networks. Individual projects are required. Prerequisite: InfE. 311.
316. **Introduction to Network Synthesis.** 4 hours. Continues Information Engineering 315. Covers positive real functions, L-C synthesis, RC, RL, and RLC synthesis, and filter design. Individual projects are required. Prerequisite: InfE. 315.
320. **Introductory Wave Propagation and Transmission.** 5 hours. Transmission line theory and introduction to waveguides; elementary antenna theory. Prerequisite: InfE. 221.
324. **Wave Propagation and Radiation I.** 4 hours. Maxwell's equations and electromagnetic waves. Analysis of wave propagation in rectangular and circular waveguides. Reduction of waveguide discontinuity problems to equivalent network problems. Prerequisites: InfE. 311 and 320.

325. **Wave Propagation and Radiation II.** 4 hours. Antennas and radiating systems. Radiation from a quarter-wave monopole or half-wave dipole. Antenna impedance. Directional characteristics of antennas. Antenna practice and design. Prerequisite: InfE. 324.
326. **Wave Propagation and Radiation III.** 4 hours. Motion of charged particles in fields. Principles of klystrons, magnetrons, and traveling wave tubes. Introduction to solid state parametric devices. Prerequisite: InfE. 325.
330. **Communication Theory I.** 4 hours. With Information Engineering 331, an introduction to statistical communication theory. Signal spectra, modulation, noise, probability theory; applications of statistics to communication systems. Prerequisite: InfE. 312.
331. **Communication Theory II.** 4 hours. Continues Information Engineering 330. Individual projects are required. Prerequisite: InfE. 330.
340. **Intermediate Electronics.** 4 hours. Continues Information Engineering 240. Applications of tubes, transistors, and semiconductor diodes; practical laboratory experience. Prerequisite: InfE. 240.
342. **Solid State Electronics.** 4 hours. Semiconductor physics and semiconductor circuits. Physics and circuit properties of transistors, semiconductor diodes, and other semiconductor devices; practical laboratory experience. Prerequisite: InfE. 340.
344. **Electronic Applications I.** 4 hours. With Information Engineering 345, a discussion of devices and circuits involved in pulse, digital, and switching waveforms. Prerequisite: InfE. 342.
345. **Electronic Application II.** 4 hours. Continues Information Engineering 344. Prerequisite: InfE. 344.
352. **Biocontrol.** 3 hours. Demonstration of the applicability of control systems theory to physiological systems, including the pupil system, eye and hand movement systems, and utilizing techniques such as Fourier analysis, Nyquist stability criteria, and cross-correlation. Prerequisite: InfE. 311 or consent of the instructor.
353. **Biocontrol Laboratory.** 3 hours. Experimental counterpart of Information Engineering 352. Motor coordination, crayfish photoreceptor, human pupil eye movement. Prerequisite: Credit or registration in InfE. 352.
359. **Neuroanatomy.** 3 hours. Same as Biological Sciences 359. An introduction to the anatomy of the central nervous system, using a programmed text and supplementary material in the form of visual aids and outside readings. Prerequisite: One year of biological sciences or consent of the instructor.

- 360. Automatic Control Theory I. 4 hours.** Introductory mathematical preliminaries of control systems. Concept of feedback; transfer functions of typical electrical, mechanical, and hydraulic control systems; state variable representation of systems; signal flow graphs; implications of feedback on system performance; time domain analysis; stability concepts including Lyapunov, Routh-Hurwitz, and Nyquist. Stability criteria. Laboratory assignments include experimental determination of the response of typical control systems and analog computer simulations. Prerequisite: InfE. 311 or SysE. 312.
- 361. Automatic Control Theory II. 4 hours.** Continues Information Engineering 360. Introduction to the design of feedback control systems. Frequency response methods, root locus, Nichols chart compensation techniques. Introduction to modern control theory, matrix representation of linear systems and mode interpretations, concepts of controllability and observability, and linear time-varying systems. Projects involving intensive studies on servo systems and extensive simulations on digital or analog computers. Prerequisite: InfE. 360.
- 371. Computer Structure and Language. 4 hours.** Computer structure and machine language, addressing techniques, components and circuits to execute the machine language instructions, digital representation of data, symbolic coding and programming techniques, computer system organization. Prerequisites: Math. 195, 340, and InfE. 340.
- 372. Discrete Mathematics in Computer Design. 3 hours.** Basic set algebra, algebraic structures, Boolean algebra and propositional logic and their applications to the design of switching circuits, graph theory, and applications. Prerequisite: InfE. 371.
- 373. Switching Theory and Applications. 3 hours.** Nondecimal number systems; error correcting and other codes, analysis of gating components and networks, truth tables, combinational networks, threshold logic, regular expressions, synthesis of sequential circuits, iterative and symmetric networks. Prerequisite: InfE. 372.
- 379. Real-Time Data Processing. 4 hours.** Theory and techniques of data processing using analog and digital computers. Emphasis on the unique computational problems presented by biological data, illustrating the practical use of communication theory. Prerequisites: Math. 195 and 220.
- 383. Animal Physiology I. 5 hours.** Same as Biological Sciences 363. The role of the digestive, circulatory, respiratory, and osmoexcretory systems in the maintenance of organismic homeostasis. Emphasis on vertebrates. Lecture and laboratory. Prerequisite: InfE. 284.



384. **Animal Physiology II.** 5 hours. Same as Biological Sciences 364. The role of the muscular, sensory, nervous, and endocrine systems in the maintenance of organismic integration. Emphasis on vertebrates. Lecture and laboratory. Prerequisite: InfE. 284.
391. **Seminar.** 1 to 4 hours. Topics to be arranged. Prerequisite: Senior standing or consent of the instructor.
393. **Special Problems.** 2 to 4 hours. May be repeated for credit. Special problems or reading by special arrangement with the faculty. Prerequisite: Senior standing or consent of the instructor.

## ITALIAN (Ital)

101. **Elementary Italian.** 4 hours. Two additional half hours per week in the language laboratory. For students without credit in Italian. Oral practice, reading, and grammar.
102. **Elementary Italian.** 4 hours. Two additional half hours per week in the language laboratory. Continues Italian 101. Prerequisite: Ital. 101 or the equivalent.
103. **Elementary Italian.** 4 hours. Two additional half hours per week in the language laboratory. Continues Italian 102. Prerequisite: Ital. 102 or the equivalent.
104. **Intermediate Italian.** 4 hours. Two additional half hours per week in the language laboratory. Rapid reading, grammar review, composition, conversation. Prerequisite: Ital. 103 or two years of high school Italian.
105. **Intermediate Italian.** 4 hours. Two additional half hours per week in the language laboratory. Continues Italian 104. Prerequisite: Ital. 104 or the equivalent.
106. **Intermediate Italian.** 4 hours. Two additional half hours per week in the language laboratory. Continues Italian 105. Prerequisite: Ital. 105 or the equivalent.

## LANGUAGE LABORATORY (LangL)

150. **For students taking any 101 foreign language course.** Intensive oral-aural practice. Two to six half hours per week.
151. **For students taking any foreign language course beyond the 101 level**

which requires the use of the Language Laboratory. Intensive oral-aural practice. Two to six half hours per week.

## LATIN (Lat)

Asterisks (\*) indicate general education credit in humanities.

101. **Elementary Latin I. 4 hours.** For students who have no credit in Latin. Grammar and reading. One additional half hour per week in the language laboratory. **F**
102. **Elementary Latin II. 4 hours.** Continues Latin 101. Grammar and reading of easy prose and poetry. One additional half hour per week in the language laboratory. Prerequisite: Lat. 101 or the equivalent. **W**
103. **Elementary Latin III. 4 hours.** Review of grammar; reading of prose. One additional half hour per week in the language laboratory. Prerequisite: Lat. 102 or two years of high school Latin. **S**
104. **Intermediate Latin I. 4 hours.** Selected readings in prose and poetry. Review of forms and grammar. One additional half hour per week in the language laboratory. Prerequisite: Lat. 103 or two years of high school Latin. **F**
105. **Intermediate Latin II. 4 hours.** Continues Latin 104. One additional half hour per week in the language laboratory. Prerequisite: Lat. 104 or the equivalent. **W**
106. **Intermediate Latin III. 4 hours.** Continues Latin 105. One additional half hour per week in the language laboratory. Placement by proficiency examination. Prerequisite: Lat. 105 or the equivalent. **S**
109. **Honors Course I. 4 hours.** *Note:* A student must have credit in Latin 110 and 111 to receive credit in 109. Rapid reading of Latin prose. Prerequisite: Three or four years of high school Latin with a B average or better or Lat. 106 or advanced placement by examination or consent of the instructor.
110. **Honors Course II. 4 hours.** *Note:* A student must have credit in Latin 109 and 111 to receive credit in 110. Rapid reading of Latin poetry. Prerequisite: Three or four years of high school Latin with a B average or better or Lat. 109 or advanced placement by examination or consent of the instructor.
111. **Honors Course III. 4 hours.** *Note:* A student must have credit in Latin 109

and 110 to receive credit in 111. Individual assignments at the discretion of the instructor. Rapid reading of Latin prose and poetry. Prerequisite: Three or four years of high school Latin with a B average or better or Lat. 110 or advanced placement by examination or consent of the instructor.

- \*201. **Survey of Latin Literature I. 4 hours.** *Note:* A student must have credit in Latin 202 and 203 to receive credit in 201. Writings of the early period. Prerequisite: Lat. 106 or the equivalent.
- \*202. **Survey of Latin Literature II. 4 hours.** *Note:* A student must have credit in Latin 201 and 203 to receive credit in 202. Writing of the middle period. Prerequisite: Lat. 201.
- \*203. **Survey of Latin Literature III. 4 hours.** *Note:* A student must have credit in Latin 201 and 202 to receive credit in 203. Writings of the late period. Prerequisite: Lat. 202.
- \*204. **Catullus: Carmina. 4 hours.** All the poems of Catullus, with special attention to the lyrics. Prerequisite: Lat. 106 or the equivalent. **F**
- \*205. **Pliny the Younger: Epistulae. 4 hours.** Selections from the correspondence. Prerequisite: Lat. 106 or the equivalent. **F**
- \*206. **Cicero: Philosophic Essays. 4 hours.** Selections from one or more of Cicero's philosophic writings—*De Amicitia*, *De Senectute*, *De Officiis*, *Tusculanae Quaestiones*. Prerequisite: Lat. 106 or the equivalent. **W**
- \*207. **Terence: Fabulae. 4 hours.** Selections from two or more plays. Prerequisite: Lat. 106 or the equivalent. **S**
- \*211. **Fundamentals of Latin Prose Composition. 2 hours.** May be repeated for a maximum of 6 hours. Review of grammar and forms; extensive translation from English to Latin; stress on the relationship of style to diction. Primarily for students majoring in Latin. **W, S, F**
- \*250. **Ovid: Metamorphoses, Selections. 4 hours.** Reading and translation of selected books and myths from the *Metamorphoses*. Prerequisite: Lat. 106 or the equivalent.
- \*251. **Juvenal: Saturae. 4 hours.** Selections from the sixteen extant satires. Prerequisite: Lat. 106 or the equivalent.
- \*252. **Livy: Ab urbe condita, Selections. 4 hours.** Reading and translation of selected books from Livy's *History of Rome*. Prerequisite: Lat. 106 or the equivalent. **S**
- \*299. **Independent Reading. 4 hours.** Individual study under faculty direction.

For students qualified by preparation and interest. Prerequisite: Lat. 201 or the equivalent. 5

- \*301. **Corpus Caesarianum.** 4 hours. For secondary school teachers of Latin and prospective teachers. Rapid reading of Latin prose, based on the *Corpus Caesarianum*, with discussion of the social and political aspects which contribute to understanding of the texts read. Prerequisite: Senior standing in Latin or consent of the instructor.
- \*302. **Vergil, I. Aeneid.** 4 hours. The first course in a three-course sequence covering the major works. Prerequisite: Junior standing or consent of the instructor.
- \*303. **Vergil, II. Aeneid.** 4 hours. Continues Latin 302. Prerequisite: Latin 302 or consent of the instructor.
- \*304. **Vergil, II. Aeneid.** 4 hours. Continues Latin 303. Prerequisite: Lat. 303 or consent of the instructor.
- \*310. **Plautus. Fabulae.** 4 hours. Reading of two plays of Plautus in the original. Prerequisite: Any 200-level course in Latin.
- \*350. **Medieval Latin.** 4 hours. A literary and linguistic study of Latin texts originating between 350 and 1350 A.D. Prerequisites: Lat. 106 and 203 or the equivalents.
- \*360. **Horace: Odes and Epodes.** 4 hours. The chief lyrical poems. Prerequisite: Any 200-level course in Latin.
- \*361. **Horace: Staurae.** 4 hours. The satirical poems. Prerequisites: Lat. 106 and 203 or the equivalents.
- \*370. **Tacitus; Selections.** 4 hours. From the historical and biographical works. Prerequisite: Any 200-level course in Latin.
- \*381. **Roman Literary Criticism.** 4 hours. The principal contributions of Latin writers to the study of literature. Prerequisite: At least 12 hours credit in Latin at the 200-level or the equivalent.
- \*382. **Roman Rhetoric.** 4 hours. The contributions of writers in Latin to the study and practice of rhetoric. Prerequisite: At least 12 hours credit in Latin or the equivalent.
- 390. **The Teaching of Latin in the Secondary School.** 4 hours. Theory and practice in foreign language instruction as they apply specifically to teaching Latin at the secondary level: objectives of instruction in Latin, historical perspectives, texts, and materials of instruction; preprofessional orientation.

Prerequisite: At least 8 hours credit in Latin at the 300 level or approval of the department.

## LINGUISTICS (Ling)

295. **Modern English Grammar.** 4 hours. Same as English 295. Provides study in definition and meaning; use of dictionaries; grammars; survey of syntax. Prerequisite: Junior standing or consent of the instructor.

## MANAGEMENT (Mgmt)

330. **Organizational Psychology.** 4 hours. Same as Psychology 330. Individual psychological and group processes and their interaction with organizational structure. Behavioral factors in effective organizational change. Prerequisites: Psch. 130 and one course in social psychology, or the equivalents.
333. **Motivation and Morale in Industry.** 4 hours. Same as Psychology 333. Concepts and methods in the assessment and modification of employee motivation, attitudes, and morale. Prerequisite: 12 hours of psychology including Psch. 332, or the equivalent.
335. **Psychology of Industrial Training.** 4 hours. Same as Psychology 335. Psychological measurement techniques in assessing training needs and evaluating training effectiveness. Application of psychological techniques to the development of industrial training programs. Prerequisite: Psch. 332 or the equivalent.
338. **Psychology of Industrial Conflict.** 4 hours. Same as Psychology 338. Behavioral analysis of the causes, dimensions, and modes of industrial conflict; special emphasis on labor-management relations. Prerequisite: Psch. 330 or the equivalent.
350. **Organization and Administration.** 4 hours. Theories of management; concepts of organization; major functions of management; fundamentals of decision making. Emphasis on the role of management and administration within the business firm. Prerequisite: Junior standing.
351. **Organization Theory.** 4 hours. Important theories of organization: their foundation, application, and consequences in the attainment of individual and organization objectives. Emphasis on formal and informal aspects of organization, authority relationships, and structural aspects. Prerequisite: Mgmt. 350.
352. **Administrative Practices.** 4 hours. An examination of executive and manager behavior in working organizations. Analysis of human problems and relationships at work. Leadership styles, problems of motivation and attitudes. Emphasis on behavioral science theory and technology. Case method of analysis and study. Prerequisite: Mgmt. 351.



- 353. Personnel Management. 4 hours.** The foundation, history, and objectives of manpower management; motivation and supervision; selection, training, and discipline; union-management relations; wage-and-salary administration; personnel research. Prerequisite: Mgmt. 351.
- 354. Industrial Relations Systems. 4 hours.** Analysis of labor unions and their impact on business firms and society. Types of labor-management relationships and collective bargaining practices. Examination of public policy, union structure, and bargaining theory. Prerequisite: Mgmt. 353.
- 356. Operations and Systems Management I. 4 hours.** Application of management science and modern techniques of analysis to production problems. Emphasis on systems and operations management to production programs, quality control, facilities design, production flow, and cost control. Analysis of computer contributions to decision making and problem solving. Prerequisites: Mgmt. 351; Math. 110, 111, 112; QM 170, 171, 172.
- 357. Operations and Systems Management II. 4 hours.** Emerging concepts in management science. Managerial applications of computer technology and utilization and related electronic data processing. Application of quantitative methods to information and control methods and systems. Process and systems design. Prerequisite: Mgmt. 356.
- 359. Business Policy. 4 hours.** A capstone course which provides the student with an understanding of the direction of business operations from the top-management point of view rather than from the limited view of a particular functional-area specialist. By means of class discussion, written analysis of cases, and development of feasible plans of action, the student gains experience in determining problem areas in company planning and management and in dealing successfully with a constantly changing business environment. Prerequisites: Senior standing and completion of core requirements of the College of Business Administration.
- 399. Independent Study. 2 to 4 hours.** May be repeated once for credit. Students in the College of Business Administration may register for this course to pursue advanced independent study in approved topic(s) related to management. Written report prepared under the guidance of a major professor is required. Prerequisites: 16 hours of upper-division management courses and consent of the department head.

## **MARKETING (Mktg)**

- 360. Principles of Marketing. 4 hours.** Theory and practice in the formulation of marketing decisions; planning, pricing, and promotion; distribution of goods and services to all types of customers. Prerequisite: Junior standing.

- 361. Consumer Market Behavior. 4 hours.** Motivations underlying market behavior of consumers, producers, middlemen; drives, emotions, desires, learning, memory; effects of demographic characteristics, social status, and reference groups on marketing action. Prerequisite: Mktg. 360 or consent of the instructor.
- 362. Marketing Research. 4 hours.** An investigation of the gathering and interpretation of information used in solving marketing problems; pertinent modern research techniques from mathematics and the behavioral sciences are employed in developing an analytical structure. Prerequisites: Mktg. 361 and QM 172 or the equivalents.
- 363. Marketing Organization. 4 hours.** Principles underlying the development of an integrated distribution system; its relationship to the marketing structure of the firm; evaluation of decisions on raw-material sources, plant and warehouse location, wholesale and retail outlets; analysis of the movement of products through marketing channels. Prerequisite: Mktg. 362 or consent of the instructor.
- 364. Managing Marketing Communications. 4 hours.** Analysis of communication information among producers, middlemen, and consumers for marketing purposes; managerial problems in directing a firm's promotional efforts; personal selling, advertising, sales promotion, public relations. Prerequisite: Mktg. 363 or consent of the instructor.
- 365. Marketing Management. 4 hours.** Seminar. Building marketing programs to implement the achievement of marketing objectives. Individual and group research and presentation from the viewpoint of major marketing executives of the firm; business case analysis. Prerequisite: Mktg. 364.

## **MATERIALS ENGINEERING (MatE)**

- 101. Engineering Mechanics I. 3 hours.** Statics of particles and rigid bodies. Kinematics and dynamics of particles. Work and energy, impulse and momentum. Principles of vibration analysis. Prerequisite: MatE. 111, Math. 132, or the equivalent.
- 102. Engineering Mechanics II. 3 hours.** Kinematics and kinetics of rigid bodies, energy and momentum methods. Mechanical vibrations of rigid bodies. Prerequisite: MatE. 101.
- 103. Engineering Mechanics III. 3 hours.** Analysis of stress and strain, principal stresses and strains. Constitutive laws of elastic and selected types of inelastic materials. Strain energy and failure criteria. Simple problems of stress and deformation analysis. Prerequisite: MatE. 111, Math. 133, or the equivalent.

111. **Engineering Statics.** 3 hours. Resultants of force systems, algebraic and graphical condition of equilibrium for force systems; moment diagrams, virtual work, forces due to friction; centroids. Prerequisite: Math. 130.
142. **Properties of Materials I.** 4 hours. Introduction to the atomic, molecular, crystalline, and microstructural nature of metals, ceramics, and plastics. Equilibrium phase relationships. Dependence of mechanical and physical properties on microstructure. Prerequisite: Math. 131, high school credit in chemistry or the equivalent.
200. **Engineering Mechanics III.** 4 hours. Description of the mechanical behavior of deformable bodies. Concepts of stress and strain, principal stresses and strains, constitutive laws of elastic and selected types of inelastic materials, failure and design criteria. Simple problems of stress and deformation analysis. Prerequisites: MatE. 101 and Math. 133.
203. **Composition and Properties of Concrete.** 3 hours. Properties and functions of the constituents; physical and chemical structure and hydration; strength and deformation characteristics of hardened concrete; relations between microproperties and macroproperties. Prerequisites: MatE. 103 and 142.
204. **Mechanics of Solids I.** 4 hours. The basic relations governing the behavior of an elastic body and simple exact solutions. Engineering approximations: bending, torsion, buckling. Prerequisites: MatE. 103 and Math. 133.
205. **Mechanics of Solids II.** 4 hours. Structural energy principles: virtual work, potential energy, complementary energy, reciprocity. Application to beams, frames, trusses, and the like. Prerequisite: MatE. 204.
206. **Mechanics of Solids III.** 4 hours. The plane problem of elasticity and simple solutions in Cartesian and polar coordinates. Engineering approximations: thin-walled pressure vessels, torsion of thin-walled sections, beams on elastic foundations. Prerequisite: MatE. 204.
207. **Structural Analysis I.** 4 hours. Analysis of statically determinate problems. Application of energy methods to statically indeterminate problems. Beam-columns and beams on elastic foundation. Influence lines. Prerequisite: MatE. 205.
208. **Mechanical Vibrations.** 4 hours. Free and forced vibrations of damped and undamped linear single and multiple degree-of-freedom systems. Introduction to nonlinear system vibration. Approximate methods, instrumentation, and applications. Prerequisites: MatE. 102, Math. 220 or the equivalents.
209. **Analysis and Synthesis of Mechanisms.** 4 hours. Analytical and graphical analysis of plane and spatial motion. Geometrical and algebraic synthesis of mechanisms. Computer methods, applications. Prerequisite: MatE. 102.

- 221. Behavior and Design of Metal Structures I. 3 hours.** Design of metal structures; behavior of members and their connections; theoretical, experimental, and practical bases for proportioning members. Prerequisite: MatE. 205.
- 225. Design of Concrete Structures. 4 hours.** Analysis and design of concrete structural elements: beams, columns, slabs, and the like. Prestressed concrete design. Prerequisite: MatE. 203.
- 230. Properties of Materials II. 4 hours.** Effects of deformation and thermal treatments upon microstructure and properties. Heat treatment of precipitation and transformation hardenable materials. Corrosion and surface reactions. Prerequisite: MatE. 142.
- 239. X-Ray Metallography I. 3 hours.** Part I of a two-course sequence. X-ray generation and scattering. Applications of methods of X-ray diffraction to studies of crystallography and problems in physical metallurgy, such as phase identification, lattice parameter determination, grain size determination, preferred orientation, surface topography and residual stress determination. Prerequisite: MatE. 230.
- 241. Experimental Methods in Solid and Fluid Mechanics. 4 hours.** Same as Energy Engineering 241. Introduction to the theory and practice of experimental methods, measurement techniques in solids and fluids, analysis of errors. Concurrent laboratory experiments and reports. Prerequisites: EnrE. 211, MatE. 102 and 103.
- 243. Metallurgical Problems. 4 hours.** Theory and application of the laws of thermodynamics to metallic systems; problems concerning industrial and metallurgical processes. Prerequisite: EnrE. 201, and Chemistry Common Core sequence.
- 244. Materials Processing II. 3 hours.** Principles and practices of casting and joining processes. Solidification of metals. Properties of mold materials. Diffusion bonding, brazing, and soldering. Prerequisite: MatE. 230.
- 245. Materials Processing Laboratory II. 1 hour.** Experimental melting, casting, mold preparation, analysis of defects in sand, permanent mold, investment and shell castings, mold control, pattern design. Prerequisite: Credit or registration in MatE. 244.
- 246. Numerical Control Processing. 3 hours.** Application of data processing to machine control, machine and tooling requirements. Computer utilization. Machine language. Machining techniques and control methods for efficient use of numerical control. Prerequisites: Junior standing and Math. 195.



247. **Manufacturing Cost Analysis.** 3 hours. Techniques of economic analysis of mechanical processes, mechanical process planning, estimating, value engineering, inspection and quality standards, direct and indirect costs, amortization of capital expenditures, useful life of equipment, depreciation, salvage values. Prerequisites: MatE. 241, 244, and 249.
248. **Materials Processing I.** 4 hours. Principles and practices of metal production and refining, heat treating, and surface treatments. Introduction to steelmaking, hardenability concept, and carburizing, nitriding. Prerequisites: EnrE. 211 and MatE. 243.
249. **Materials Processing IV.** 4 hours. Mechanics of metal cutting. Application of metal removal principles in machining. Analysis and optimizing of metal cutting variables by use of computers. Tool and machine requirements in metal removal processes. Problems in plastic machining. Ceramic removal processes. Prerequisite: Credit or concurrent registration in MatE. 241.
250. **Physical Metallurgy I.** 3 hours. Part I of a three-course sequence. Principles and interpretation of phase diagrams; relationships between structure, thermal history, and properties. Prerequisite: MatE. 230.
251. **Physical Metallurgy II.** 3 hours. Part II of a three-course sequence. Fundamental treatment of mechanical properties. Elastic behavior. Plastic behavior of single crystals. Elements of dislocation theory. Plastic behavior of polycrystalline aggregates. Fracture. Prerequisite: MatE. 250.
252. **Physical Metallurgy III.** 3 hours. Part III of a three-course sequence. Diffusion, nucleation. Transformation kinetics. Creep and rupture. Oxidation and corrosion. Alloys of iron and carbon. Prerequisite: MatE. 251.
253. **Physical Metallurgy Laboratory I.** 1 hour. Part I of a three-course sequence. Demonstration of the principles of solidification, cold-working, annealing, and heat treatment of metals. Study of microstructures of simple binary alloys. Principles and techniques of metallography and photomicrography; analysis and interpretation of microstructures. Prerequisite: Registration in MatE. 250.
254. **Physical Metallurgy Laboratory II.** 1 hour. Part II of a three-course sequence. Demonstration of the principles of solidification, cold-working, annealing, and heat treatment of metals. Study of microstructures of simple binary alloys. Principles and techniques of metallography and photomicrography; analysis and interpretation of microstructures. Prerequisite: Registration in MatE. 251.
255. **Physical Metallurgy Laboratory III.** 1 hour. Part III of a three-course sequence. Demonstration of the principles of solidification, cold-working,



annealing, and heat treatment of metals. Study of microstructures of simple binary alloys. Principles and techniques of metallography and photomicrography; analysis and interpretation of microstructures. Prerequisite: Registration in MatE. 252.

260. **Soil Behavior I. 3 hours.** Origin of soil deposits and mineral composition of soils. Soil classification. Soil compaction. Soil as a three-phase system: effective and neutral stresses, effective stress principle. Soil water: Permeability, capillarity, frost heaving. Consolidation. Lectures and laboratory. Prerequisite: MatE. 103.
261. **Soil Behavior II. 3 hours.** The effect of subsurface soil conditions on choice of foundation. Subsurface soil exploration. Type of foundations: spread footings, mat, pile foundations. Proportioning foundations for settlement and bearing capacity. Earth pressures. Design of rigid retaining structures: retaining walls; bracing of excavations. Prerequisite: MatE. 260.
262. **Soil Behavior III. 4 hours.** Shear strength: failure theories; shear strength of sands, saturated and partly saturated clays. Analysis of embankments and earth dams for stable slopes. Analysis and design of flexible retaining structures. Lectures and laboratory. Prerequisite: MatE. 261.
283. **Design Project in Mechanical Analysis and Design. 4 hours.** Analytical or experimental design project in mechanical design. Prerequisite: MatE. 209.
291. **Undergraduate Seminar. 2 hours.** Students will conduct an in-depth study of areas of materials engineering which are of special interest to them. Oral and written reports are required. Prerequisite: Senior standing.
292. **Undergraduate Research. 2 to 4 hours.** Research under the close supervision of a faculty member. Prerequisite: Consent of the instructor.
301. **Introduction to the Mechanics of Continua. 4 hours.** Vectors and tensors and their component properties in Cartesian coordinates. The displacement and velocity vectors, the stress and strain tensors and their time rates. Isotropic and deviatoric components. Equations of equilibrium and of compatibility. Constitutive relations for linear elastic and viscous bodies and generalized linear viscoelastic behavior. Isotropy. Introduction to perfect plasticity. Sample problems for all cases by means of simple one-dimensional models. Prerequisite: MatE. 103, Math. 220, or consent of the instructor.
302. **Applied Elasticity I. 4 hours.** Variational theorems of elasticity theory. Application to establishment and solution of approximate systems: beams (including shear deformations) and plates. Introduction to instability theory. Prerequisite: MatE. 205 or 206.

- 303. Theory of Elasticity I. 4 hours.** The boundary value problems of linear isotropic elasticity theory. Uniqueness of solution. Reduction to two dimensions: the plane problem, torsion, bending. General orthogonal coordinates and special application to polar coordinates. Three-dimensional problems with axial symmetry. Prerequisite: MatE. 301.
- 304. Experimental Stress Analysis. 4 hours.** Structural similitude and dimensional analysis. Brittle coating. Introduction to photoelasticity. Strain measurement techniques. Prerequisite: MatE. 206.
- 308. Intermediate Vibration Theory. 4 hours.** Analytical and numerical treatment of vibrations induced in  $n$ -degree of freedom linear discrete systems by periodic, shock, and random excitation. Prerequisite: MatE. 208.
- 311. Intermediate Dynamics. 4 hours.** Kinematics of a point, space curves. Particle dynamics, orbital motion and stability. Moving reference frames. Rigid body dynamics: the inertia tensor, Euler's equations, application to gyroscopic motion. Hamilton's principle. Generalized coordinates. Lagrange's equations. Prerequisite: MatE. 102, Math. 220, or consent of the instructor.
- 312. Nonlinear Oscillations. 4 hours.** Exact and approximate methods of studying vibrations of nonlinear systems. Analytical and graphical techniques. Forced oscillations, self-excited systems, stability criteria. Computer methods. Practical applications. Prerequisite: MatE. 208.
- 313. Applied Dynamics. 4 hours.** Application of principles of dynamics to engineering physics. Balancing; rolling and sliding contact, static and dynamic force analyses of machine elements. Critical speeds. Impacting loading. Prerequisite: MatE. 311, or consent of the instructor.
- 316. Introduction to Continuum Mechanics. 4 hours.** Same as Energy Engineering 316. Cartesian tensors, kinematics of fluids and solids, conservation equations, constitutive equations for simple materials. Examples. Prerequisites: EnrE. 211 or MatE. 204, and Math. 220.
- 321. Structural Analysis II. 4 hours.** Establishment of basic equations governing linear structural systems. Matrix inversion and relaxation solutions. Approximate analyses. Introduction to dynamics of structures. Prerequisite: MatE. 207.
- 322. Concrete Technology I. 4 hours.** Relations between microproperties and macroproperties; mechanisms of fracture, creep, and shrinkage; statistical aspects; air entrainment; special types of concrete. Individual research project involving laboratory and analytic techniques. 3 hours, lecture; 2 hours, laboratory. Prerequisite: MatE. 203 or the equivalent.
- 324. Limit Analysis and Design of Structures. 4 hours.** Boundedness principles

of perfect plasticity. Application to analysis and design of structures. Prerequisite: MatE. 207.

331. **Electron Theory of Metals.** 3 hours. Modern physical concepts of metals and alloys. Introduction to wave mechanics. Thermal, electrical, and magnetic properties of metals. Band theory of metals. Prerequisite: MatE. 252.
332. **Advanced Diffraction Analysis.** 3 hours. Single crystal methods in X-ray diffraction, orientation determination, pole figures, structure determination, precision lattice constant methods. Prerequisite: MatE. 239 or the equivalent.
333. **Design Use of Materials.** 4 hours. Extreme value statistics. Mechanical effects of a notch. Fracture mechanics. Fatigue. Stress rupture. Residual stress effects. Relationships to designed performance. Prerequisite: MatE. 230.
334. **Metallurgy of Nuclear Materials.** 3 hours. Uses of materials for the production of nuclear energy, environmental problems associated with radiation damage, mechanical and physical property changes, swelling, poisoning, fission, moderation, neutron capture, and latent activity. Prerequisites: Phys. 114 and MatE. 252.
335. **Electron Microscopy.** 3 hours. The electron microscope and its application to the study of surface replicas and thin films of metals, alloys, and other materials. Sources of contrast. Selected area diffraction. Prerequisites: MatE. 239 and 252.
337. **Process Metallurgy of Iron and Steelmaking.** 4 hours. Physicochemical principles applied to reduction, conversion, and refining of steel and ferrous alloys. Applications of thermodynamics to equilibrium problems, such as slag-metal equilibria, and applications of process engineering principles to the dynamic behavior of various component systems, such as sinter plants, blast furnaces, and basic oxygen furnaces. Prerequisite: MatE. 243 or consent of the instructor.
341. **Theoretical Soil Mechanics I.** 3 hours. Theories used in soil mechanics. Derivation of theoretical relationships and theoretical implications of empirical laws. Theories of deformation of soil systems; states of stress and deformation in soil masses; one-dimensional theory of consolidation for homogeneous and nonhomogeneous clay layers; seepage as a function of isotropy and homogeneity. Prerequisite: MatE. 202 or the equivalent.
342. **Theoretical Soil Mechanics II.** 4 hours. Stresses and displacements in earth masses. The analysis of layered systems: analytical, finite difference, finite element methods. Settlement analysis: soil-structure interaction. Analysis of structural response of flexible and rigid pavements. Development of problem-oriented computer languages for settlements. Prerequisites: MatE. 341 and Math. 322.

- 343. Theoretical Soil Mechanics III. 4 hours.** Seepage through earth masses: derivation of basic equations; analytical and numerical methods of solution; rapid drawdown. Stability of earth slopes: derivation of basic relationships; methods of Fellenius, Bishop, Morganstern. Computer methods for slope stability and seepage: problem-oriented languages. Prerequisite: Math. 322.
- 344. Physical-Chemical Principles of Soil Behavior I. 4 hours.** Clay mineralogy, soil formation and composition, sedimentation, mineral identification, colloid phenomena in soils. Prerequisite: MatE. 260.
- 345. Physical-Chemical Principles of Soil Behavior II. 4 hours.** Swelling, ion association, soil-water analysis of mechanical behavior of soils in terms of physiochemical principles conduction phenomena. Prerequisite: MatE. 344.
- 346. Physical-Chemical Principles of Soil Behavior III. 4 hours.** Deformation mechanisms and strength, compaction, frost action, rate processes, such as secondary compression, creep, thixotropy. Prerequisite: MatE. 345.
- 360. Deformation Processing. 4 hours.** Principles of deformation processes. Basic methods of problem solving. Practices and process control. Relations between processing and finished properties. Prerequisite: MatE. 230 or consent of the instructor.
- 361. Deformation Processing Laboratory. 1 hour.** Measurements of flow stress and formability. Effect of friction in forging, rolling, and deep drawing. Limiting reductions, optimum die angles in drawing. Effect of plastic anisotropy in deep drawing. Prerequisite: MatE. 360.
- 362. Powder Metallurgy. 3 hours.** Physical attributes of fine powders. Mechanics of pressing. Theories of solid state sintering. Liquid phase sintering. Manufacturing aspects. Prerequisite: MatE. 230 or consent of the instructor.
- 363. Advanced Phase Diagrams. 3 hours.** Ternary phase equilibria in metal systems. Vertical and horizontal sections, methods of construction and interpretation. Examination of quaternary and more complex systems. Application of thermodynamic principles to construction. Prerequisite: MatE. 250.
- 381. Design Project in Structural Mechanics. 4 hours.** Analytical or experimental design project in structural mechanics. Prerequisite: Senior standing.
- 384. Metallurgical Process Design. 3 hours.** Design and optimization of chemical and mechanical metallurgical processing systems. Process modeling and analysis. Direct search linear and dynamic programming solutions of process problems. Economic analysis and investment strategy. Prerequisites: Senior standing and MatE. 243.



391. Seminar. 1 hour. Topics to be arranged. Prerequisite: Consent of the instructor.
393. Special Problems. 2 to 4 hours. Special problems or reading by special arrangement with the faculty. Prerequisite: Consent of the instructor.

## MATHEMATICS (Math)

Asterisks (\*) indicate general education credit in natural sciences.

100. Algebra and Trigonometry I. 5 hours. Credit is not given for Mathematics 100 if the student has credit in Mathematics 104. Fundamentals of algebra, factoring, fractions, radicals, exponents, solutions of equations, complex numbers, logarithms, progressions. Prerequisites: 1 unit of entrance credit in algebra and 1 unit in plane geometry. F, W, S, Su
101. Algebra and Trigonometry II. 5 hours. Credit is not given for Mathematics 101 if the student has credit in Mathematics 104 and/or 105. Mathematical induction, binomial theorem, inequalities, theory of equations, determinants, permutations and combinations, trigonometric functions, identities, equations, graphs. Prerequisite: Math. 100. F, W, S, Su
104. College Algebra. 5 hours. Credit is not given for Mathematics 104 if the student has credit in Mathematics 100. Theory of equations, systems of equations, determinants, complex numbers, permutations and combinations, mathematical induction, binomial theorem, progressions, inequalities, logarithms. Prerequisites:  $1\frac{1}{2}$  units of entrance credit in algebra and 1 unit in plane geometry. F, W, S, Su
105. Trigonometry. 3 hours. Credit is not given for Mathematics 105 if the student has credit in Mathematics 101. Restricted to students who have not had a formal course in trigonometry. Identities, equations, addition formulas and derived relations, solution of triangles, radian measure, graphs, inverse functions. Prerequisites:  $1\frac{1}{2}$  units of entrance credit in algebra and 1 unit in plane geometry. F, W, S, Su
106. Mathematics for Elementary Teachers I. 4 hours. Designed to prepare students to teach contemporary mathematics programs in the elementary schools. Prerequisite: Enrollment in the College of Education. F
107. Mathematics for Elementary Teachers II. 4 hours. Prerequisite: Math. 106. W
108. Mathematics for Elementary Teachers III. 4 hours. Prerequisite: Math. 107. S



- \*110. Finite Mathematics. 5 hours.** Statements and logic, sets, Boolean algebra, probability, vectors and matrices, linear programming, theory of games. Prerequisite: Math. 101 or 104 or the equivalent. **F, W, S, Su**
- 111. Introduction to Analysis I. 3 hours.** For students in the College of Business Administration or the Department of Architecture; others, by consent of the department. Introduction to differential and integral calculus, together with sufficient material from analytic geometry to assist in the development and application of the calculus. Prerequisite: Math. 101 or 104 or the equivalent. **F, W, S, Su**
- 112. Introduction to Analysis II. 3 hours.** For students in the College of Business Administration or the Department of Architecture; others, by consent of the department. Continues Mathematics 111. Prerequisite: Math. 111. **F, W, S, Su**
- \*115. Fundamentals of Mathematics I. 4 hours.** Survey course in mathematics: numbers and numerals, algebra, progressions, number theory. Prerequisites: 1 unit of entrance credit in algebra and 1 unit in plane geometry. **F, W, S, Su**
- \*116. Fundamentals of Mathematics II. 4 hours.** Survey course in mathematics: axioms of euclidean geometry, symmetry, perspective, Cartesian geometry, conic sections, noneuclidean geometry. Prerequisite: Math 115 or consent of the instructor. **F, W, S, Su**
- \*117. Fundamentals of Mathematics III. 4 hours.** Survey course in mathematics: sets and logic, infinity, probability, statistics, calculus, computing machines. Prerequisite: Math. 116. **F, W, S, Su**
- 130. Analytic Geometry. 5 hours.** Real numbers, sets, functions, graphs, lines, conic sections, parametric equations, polar coordinates, analytic geometry of three dimensions. Prerequisite: Math. 101, or 104 and 105, or the equivalent. **F, W, S, Su**
- 131. Calculus I. 5 hours.** Introductory concepts of calculus; limits, continuity, derivatives, techniques of differentiation, applications of derivatives, anti-derivatives, the definite integral. Prerequisite: Math. 130. **F, W, S, Su**
- 132. Calculus II. 5 hours.** Integration formulas, sequences and Riemann sums and applications, the number  $e$ , circular and hyperbolic functions and their inverses, partial derivatives, mean value theorems, indeterminate forms. Prerequisite: Math. 131. **F, W, S, Su**
- 133. Calculus III. 5 hours.** Infinite series, Taylor formula and Taylor series, functions of several variables, multiple integrals, line and surface integrals. Prerequisite: Math. 132. **F, W, S, Su**

- 170. Introduction to College Mathematics I. 5 hours.** Arithmetic and algebra of signed numbers, single and simultaneous equations, properties of number systems, including estimation via the greatest integer function. Points, lines, segments, rays, and angles on a line in a coordinate plane. Prerequisite: Approval of the department.
- 171. Introduction to College Mathematics II. 5 hours.** Mathematical relations; mathematical relations compared to functions; elementary set theory; set theory and numbers; the absolute value function; three-dimensional graphs; lattices; varycentric coordinance. Prerequisites: Math. 170 and approval of the department.
- 194. Introduction to Automatic Digital Computing for Nontechnical Studies. 3 hours.** Credit is not given for both Mathematics 194 and 195; either serves as the prerequisite for more advanced programming courses. Programming a modern digital computer in a user-oriented language. Mathematics 194 is intended for students in curricula that do not require calculus; assigned problems assume only high school mathematics. **F, W, S, Su**
- 195. Introduction to Automatic Digital Computing. 3 hours.** Credit is not given for both Mathematics 194 and 195; either serves as the prerequisite for more advanced programming courses. Programming a modern digital computer in a user-oriented language. Mathematics 195 is intended for students in curricula that require calculus; assigned problems assume the student is familiar with elementary calculus. Prerequisite: Math. 132. **F, W, S, Su**
- 198. Special Topics in Mathematics. 1 to 4 hours.** May be repeated for credit. Course content will be announced prior to each quarter in which it is given. Prerequisite: Consent of the instructor.
- 210. Ideas in Mathematics. 4 hours.** Historical and intellectual aspects of some of the key ideas of pure and applied mathematics; interplay between the development of concepts in pure and applied mathematics. Prerequisites: Superior standing and consent of the instructor.
- 220. Elementary Differential Equations I. 3 hours.** Systematic procedures for solving ordinary differential equations with emphasis on initial value problems of second order linear equations. Series solutions near ordinary and singular points. Introduction to the Laplace transforms and numerical methods. Prerequisite: Math. 133. **F, W, S, Su**
- 250. Statistics for Engineers. 5 hours.** A first course in the use of statistical methods for interpreting the results of experiments. Probability and distributions, expectation, sampling and testing, estimation problems, chi square tests, **T** and **F** tests, regression and correlation. Prerequisite: Math. 133. **F, W, S**

- 280. Problem-Oriented Languages. 3 hours.** Study of several problem-oriented machine languages, such as ALGOL, PL/1, SNOBOL. Programming exercises using these languages. Prerequisite: Math. 194 or 195.
- 281. Assembly Language Programming. 3 hours.** The logical organization of modern digital computers. Assembly language programming for such a machine. Prerequisite: Math. 194 or 195.
- 290. Introduction to the Theory of Digital Machines. 3 hours.** The general organization of computers, number systems, Boolean algebra, design of combinational circuits, and sequencing of arithmetic operations. Prerequisite: Math. 195.
- 298. Special Topics in Mathematics. 1 to 4 hours.** May be repeated for credit. Course content will be announced prior to each quarter in which it is given. Prerequisite: Consent of the instructor. **F, W, S**
- 300. Teachers Course I. 3 hours.** Graduate credit for this course is restricted. See the Graduate College Catalog. Important concepts and the problems involved in the teaching theory; treatment of numeration systems, set relations, functions, whole numbers, logic, and proof; examination of some of the major new curricula. Prerequisite: Math. 133 or consent of the instructor. **F, S**
- 301. Teachers Course II. 3 hours.** Graduate credit for this course is restricted. See the Graduate College Catalog. Continues Mathematics 300. Topics, discussed from an advanced viewpoint, include mathematical induction, the completeness axiom, composition of functions, sequences, a vector approach to geometry, axioms of the Hilbert type. Prerequisite: Math 300 or consent of the instructor. **W, Su**
- 302. Teachers Course III. 3 hours.** Graduate credit for this course is restricted. See the Graduate College Catalog. Continues Mathematics 301. Topics, discussed from an advanced viewpoint, include arithmetic and geometric progressions, continued sums and products, difference sequences, pigeon-hole principle, limits, continuity, exponential functions, logarithmic functions, circular functions, combinations and permutations. Prerequisite: Math. 301 or consent of the instructor. **F, S**
- 303. Advanced Euclidean Geometry I. 3 hours.** Graduate credit for this course is restricted. See the Graduate College Catalog. Geometry from Euclid to the present, equivalents of Euclid's fifth postulate, noneuclidean geometries, finite and projective geometries, invariants of configurations under transformation. Prerequisite: Math. 133. **F, S**
- 304. Advanced Euclidean Geometry II. 3 hours.** Graduate credit for this course is restricted. See the Graduate College Catalog. The paralld postulate,

similarity, area perpendicularity, circles and spheres, constructions with ruler and compass. Prerequisite: Math. 303. **W, Su**

305. **Advanced Euclidean Geometry III. 3 hours.** Graduate credit for this course is restricted. See the Graduate College Catalog. Ruler and compass constructions, proportionality, length and area, solid mensuration, hyperbolic geometry. Prerequisite: Math. 304. **F, S**
306. **Seminar in Mathematics for Teachers. 3 hours.** Graduate credit for this course is restricted. See the Graduate College Catalog. May be repeated for a total of 9 hours. Advanced topics and special problems in the teaching of precollege mathematics. Prerequisite: Math. 302.
307. **Theory of Sets and the Real Number System. 5 hours.** Elementary set theory and the development of the integers, the rational numbers, and the real numbers. Prerequisite: Math. 133. **F, W, S, Su**
310. **Higher Analysis I. 4 hours.** Real numbers, continuity, extensions of the mean value theorem, functions of several variables, partial derivatives. Prerequisite: Math. 133. **F, W, S, Su**
311. **Higher Analysis II. 3 hours.** Transformations, vectors, line and surface integrals. Prerequisite: Math. 310. **F, W, S, Su**
312. **Higher Analysis III. 3 hours.** Implicit functions, Riemann integration, infinite series, uniform convergence, power series, improper integrals. Prerequisite: Math. 311. **F, W, S, Su**
321. **Elementary Differential Equations II. 3 hours.** Systems of linear first order differential equations. Boundary value problems for second order linear equations, and introduction to partial differential equations. Nonlinear problems described by one or two differential equations of first order. Prerequisite: Math. 220. **F, W, S, Su**
322. **Elementary Partial Differential Equations I. 3 hours.** Second order linear partial differential equations and their initial value and boundary value problems. Separations of variables and Green's formula considerations. Eigenfunction expansions for homogeneous and inhomogeneous heat equation in finite domains. Sturm-Liouville problem. Fourier series. Prerequisites: Math. 310 and 321. **F, W, S, Su**
323. **Elementary Partial Differential Equations II. 3 hours.** The potential equation and the wave equation in finite domains. Semi-infinite domains. Fourier integrals. Cylindrical and spherical harmonics. Fourier-Bessel and Legendre-Bessel expansions. Prerequisite: Math. 332. **F, W, S, Su**
330. **Complex Analysis for Applications I. 3 hours.** Credit is not given for both Mathematics 330 and 332. Complex numbers and their geometrical represen-

tation, analytic functions, elementary functions, complex integration, Taylor and Laurent series, the calculus of residues, introduction to conformal mapping. Prerequisite: Math. 310. **F, W, S**

- 331. Complex Analysis for Applications II. 3 hours.** Branch-point integration, series and product expansions, complex integral representations of special functions (gamma, hypergeometric, Legendre, Bessel), asymptotic methods, introduction to transforms. Prerequisite: Math. 321 and 330. **W, S, Su**
- 332. Complex Variables I. 3 hours.** Credit is not given for both Mathematics 332 and 330. Power series in one variable, holomorphic functions, Cauchy's integral theorem. Taylor and Laurent expansions. Prerequisite: Math. 312. **F, S**
- 333. Complex Variables II. 3 hours.** Analytic functions of several complex variables, harmonic functions, convergence of sequences of holomorphic functions, infinite products, normal families, holomorphic transformations, holomorphic systems of differential equations. Prerequisite: Math. 332. **W, Su**
- 340. Modern Higher Algebra I. 3 hours.** Sets and real numbers, groups, rings. Prerequisite: Math. 133. **F, W, S, Su**
- 341. Modern Higher Algebra II. 3 hours.** Euclidean and polynomial rings, vector spaces, linear transformations and matrices. Prerequisite: Math. 340. **F, W, S, Su**
- 342. Modern Higher Algebra III. 3 hours.** Dual spaces, inner products spaces, modules, canonical forms of matrices, quadratic forms. Prerequisite: Math 341. **F, W, S, Su**
- 343. Formal Logic I. 4 hours.** Same as Philosophy 343. Propositional logic, logic of quantifiers, and identity and completeness. Individual conferences on assigned papers are required. Prerequisite: Consent of the instructor; none for mathematics majors. **W**
- 344. Formal Logic II. 4 hours.** Same as Philosophy 344. Continues Mathematics 343. Mathematical analysis of decidability and computability. Arithmetization of syntax. Incompleteness and undefinability theorems. Introduction to axiomatic set theory. Individual conferences on assigned papers are required. Prerequisite: Math. 343. **S**
- 348. Linear Transformations and Matrices. 5 hours.** Matrix algebra, determinants, inverses of matrices, rank and equivalence, linear independence, vector spaces and linear transformation, unitary and orthogonal transformations, characteristic equation of a matrix. Prerequisite: Math. 133. **F, W, S, Su**



350. **Introduction to Higher Geometry I.** 3 hours. Projective properties in the euclidean plane, extending the euclidean plane, the projective plane, axioms for the projective plane, conics, introduction of coordinates. Prerequisite: Math. 342.
351. **Introduction to Higher Geometry II.** 3 hours. Topics in geometry, projective planes, higher dimensional projective geometries, model as subspaces of a vector space, coordinatization. Prerequisite: Math. 350.
353. **Introduction to Differential Geometry.** 3 hours. Curves, surfaces, manifolds imbedded in euclidean space, Riemannian geometry, first and second fundamental forms of imbedded surfaces. Prerequisite: Math. 312 or consent of the instructor.
355. **Introduction to Topology I.** 3 hours. Set theory, topological spaces, metric spaces, continuous maps, connectedness, compactness, separation axioms, completely separable spaces, mappings into Hilbert spaces. Prerequisite: Math. 310. **F, S**
356. **Introduction to Topology II.** 3 hours. Locally connected spaces, arcs and arcwise connectivity, Cantor sets, Hahn-Mazurkiewicz theorem, elements of homotopy theory. Prerequisites: Math. 340 and 355. **W, Su**
357. **Introduction to Topology III.** 3 hours. Vector spaces, polytopes, homology theory, Euler-Poincare formula, simplicial mappings, Brouwer degree and Brouwer fixed-point theorem. Prerequisite: Math. 356. **F, S**
360. **Elementary Theory of Numbers I.** 3 hours. The basic concepts of the theory of numbers: divisibility, prime numbers, congruences, quadratic reciprocity law. Prerequisite: Math. 133 or approval of the department.
361. **Theory of Numbers II.** 3 hours. Functions of number theory, recurrence functions, diophantine equations, quadratic forms, Farey sequences and rational approximations. Prerequisite: Math. 360 or consent of the instructor.
362. **Theory of Numbers III.** 3 hours. Continued fractions, distribution of primes, algebraic numbers, polynomials, partitions, density of sequences of integers. Prerequisite: Math. 361 or consent of the instructor.
370. **Introduction to Probability and Statistics.** 3 hours. Probability models, univariate and multivariate distributions, random variables. Prerequisite: Math. 133. **F, W, S**
371. **Statistics I.** 3 hours. Statistical problems and procedures, estimation, testing hypotheses, distribution theory. Prerequisite: Math. 370. **W**
372. **Statistics II.** 3 hours. One-sample problems, comparison, linear models, and analysis of variance. Prerequisite: Math. 371. **S**

375. **Probability. 3 hours.** Law of large numbers, central limit theorem, recurrent events, random walks, Markov chains. Prerequisite: Math. 370. **F, W, S**
377. **Finite Differences I. 3 hours.** Difference formulas, finite integration, summation of series, Bernoulli and Euler polynomials, interpolation.\* Prerequisite: Math. 112 or 113.
378. **Finite Differences II. 3 hours.** Approximate integration, beta and gamma functions, difference equations. Prerequisite: Math. 377.
381. **Vector and Tensor Analysis I. 3 hours.** Algebra of vectors, vector differential calculus, differential geometry, Stokes' theorem, divergence theorem, applications to electricity, mechanics, hydrodynamics, and elasticity. Prerequisite: Math. 311.
382. **Vector and Tensor Analysis II. 3 hours.** Transformation properties, covariant and contravariant tensors, differential geometry of curves and surfaces, exterior differential calculus with emphasis on aspects of interest in science and engineering. Prerequisite: Math. 381.
385. **Laplace Transforms. 3 hours.** The Laplace transform and its inverse; properties of the transform; linear differential equations (ordinary and partial); linear difference equations, gamma, error, and Bessel functions, asymptotic series, nonelementary integrals, integral equations, Hankel transforms. Prerequisite: Math. 330.
387. **Numerical Analysis I. 3 hours.** Mathematics 387 and 388 together provide a comprehensive introduction to linear numerical analysis. Computational methods and error analysis of matrix inversion, eigenvalues and eigenvectors, and linear approximations. Prerequisites: Math. 133 and either 194 or 195. **F**
388. **Numerical Analysis II. 3 hours.** Continues Mathematics 387. Prerequisite: Math. 387. **W**
389. **Numerical Analysis III. 3 hours.** Numerical integration and differentiation. Quadrature in  $n$  dimensions. Numerical integration of ordinary differential equations. Prerequisite Math. 388. **S**
391. **Boolean Algebra and Switching Theory. 3 hours.** Sets, relations, functions, equivalence relations, abstract Boolean algebra. Applications of Boolean algebra. Minimization of Boolean functions. Representation of finite Boolean algebras. Prerequisite: Math. 310 or 340. **F**
392. **Introduction to Automata Theory. 3 hours.** Boolean rings and lattices as Boolean algebras. Synchronous sequential circuits. Mealy and Moore models of automata. Regular sets. Prerequisite: Math. 391. **W**

393. **Automata and Languages.** 3 hours. Types of automata and their events. The semigroup of an automaton. Basic decomposition theory. Introduction to formal languages. Grammars of types 0, 1, 2, 3. Properties of context-free languages. Prerequisite: Math. 392. S
394. **Simulation Languages.** 3 hours. Digital simulation of complex systems; general purpose and special simulation languages and their useful properties, their design and implementation; a comparison and evaluation of special languages, such as GPSS II, SIMSCRIPT, GASP, SIMPAC, DYNAMO, and SIMULATE; application of at least one of them in a term project. Prerequisites: Math. 280 and 281 or the equivalents
395. **List-Processing Languages.** 3 hours. Study of list- and string-processing languages (such as IPLV, SLIP, COMIT, SNOBOL, and LISP) from the user's point of view. Applications to nonnumeric problems, such as symbolic formula manipulation, information retrieval, and pattern recognition. Prerequisites: Math. 280 and 281 or the equivalents.
396. **Design of Compilers.** 3 hours. Design and implementation of algebraic compilers for a modern digital computer. Prerequisite: Math. 281.
397. **Computer Operating Systems.** 3 hours. Problems of planning and implementing an operating system for a modern digital computer so as to utilize its power to the fullest possible extent. Prerequisite: Math. 281.
399. **Honors in Mathematics.** 3 hours. May be repeated for credit. Seminars on special topics and advanced problems to permit students majoring in mathematics to do independent study under the guidance of senior members of the staff. Prerequisites: Math. 312 and 342 or consent of the instructor. F, W, S, Su

## MILITARY SCIENCE (MiS)

100. 125. **Leadership Laboratory.** No credit. The laboratory develops the cadet's leadership characteristics by practical, progressive training in command and drill. The numerical sequence corresponds to the cadet's year-and-quarter progression and accomplishments: First-quarter freshman—Military Science 100; second-quarter freshman—Military Science 125, sequentially. Prerequisites: Approval of the department, enrollment in appropriate nonmilitary academic course, and full-time status.

### The Basic Course—100 series.

**General Prerequisites** for all basic courses: Enrollment in the R.O.T.C. program; 30 class hours of approved nonmilitary academic subjects per year; concurrent enrollment in the appropriate leadership laboratory.

101. **Organization of the United States Army and R.O.T.C. and Weapons and Marksmanship. 1 hour.** The organization and function of the United States Army and R.O.T.C., including the history, purpose, and objectives. Five-hour introduction to weapons and marksmanship, providing a practical working knowledge of individual weapons and their use. Prerequisites: Approval of the department, enrollment in appropriate nonmilitary academic course, and full-time status.
102. **Individual Weapons and Marksmanship and United States Army and National Security. 1 hour.** Continues Military Science 101, including practical application on the University rifle range. Five hours of survey of the United States national defense policies and the role of the United States Army in their implementation. Prerequisite: MilS. 101 or approval of the department.
103. **United States Army and National Security. 1 hour.** Continues Military Science 102. Survey of United States national defense policies. Prerequisite: MilS. 102 or approval of the department.
104. **Map Reading. 1 hour.** Fundamentals of military map reading, including marginal information, map symbols, map orientation, and grid reference systems. Prerequisite: Approval of the department.
105. **Terrain Analysis, Aerial Photography, and Introduction to Tactics. 1 hour.** Continues Military Science 104. Aerial photography reading and interpretation, including terrain relationship and analysis. Introduction to small unit tactics. Prerequisite: MilS. 104 or approval of the department.
106. **Introduction to Tactics. 1 hour.** Continues Military Science 105. Application in the employment of squad and platoon units in offensive and defensive operations. Prerequisite: MilS. 105 or approval of the department.
107. **American Military History. 1 hour.** Survey of American military history from its origin through the Mexican War. The approach is analytical, with emphasis on leadership, the principles of war, and the growth of the military in the United States. Prerequisite: Approval of the department.
108. **American Military History. 1 hour.** Continues Military Science 107. From the American Civil War to World War I. Prerequisites: MilS. 107 and approval of the department.
109. **American Military History. 1 hour.** Continues Military Science 108. From World War I to the present. Prerequisites: MilS. 108 and approval of the department.

#### **The Advanced Course—200 series.**

**General Prerequisites** for all advanced courses: Junior standing; completion of the Military Science 100 series or the equivalent; 30 class hours of approved

nonmilitary academic subjects per year; concurrent enrollment in the appropriate leadership laboratory.

201. **Military Teaching. 2 hours.** An introduction to the principles, methods, and techniques fundamental to military instruction, including lesson planning and presentation, use of training aids, and methods of evaluation. Prerequisites: See **General Prerequisites**, above.
202. **Branches of the United States Army. 1 hour.** Presentation of the branches of the Army with emphasis on their assigned special missions. Designed to provide students with sufficient information to select the branch of the service in which they desire to serve. Prerequisites: See **General Prerequisites**, above.
203. **Leadership Theory and Counterinsurgency Operations. 2 hours.** Responsibilities and techniques of leadership; introduction to counterinsurgency operations. Prerequisites: See **General Prerequisites**, above.
204. **Introduction to Military Operations. 2 hours.** Development of current tactical doctrine and communications to include the impact of modern weapons and materiel. Prerequisites: See **General Prerequisites**, above.
205. **Advanced Military Operations and Introduction to Logistics. 2 hours.** Origin and purpose of the military staff, its organization and functions. Acquisition and application of military intelligence. Familiarization with the general principles of training management. Introduction to logistics. Prerequisite: MilS. 204.
206. **Role of the United States in World Affairs. 1 hour.** Emphasis on the relationships between international conflict, national purpose, national power, and national policy. The relative geographic, economic, political, sociological, and military elements of power existing in the world today. Prerequisites: See **General Prerequisites**, above.
207. **Logistics and Administration. 2 hours.** Continues Military Science 205. Principles of troop movement and motor transportation. Introduction to basic concepts and fundamentals of Army administration. Prerequisite: MilS. 205.
208. **Administration and Military Law. 2 hours.** Continues Military Science 207, concluding Army administration. Fundamental concepts of military justice; the principles and methods of courtroom procedures and nonjudicial punishment. Prerequisite: MilS. 207.
209. **Service Orientation. 1 hour.** Customs of the service; conduct and code of the officer; management of personal affairs; discussion of requirements and problems of entrance on active duty. Prerequisite: To be taken only during the cadet's senior year.



210. **Military Communications. 1 hour.** Means and principles of signal communication; codes, authentication, and communication security; characteristics, operation, and employment of radio and wire equipment; maintenance of signal communication equipment. Prerequisite: MilS. 106.

## MUSIC (Mus)

Asterisks (\*) indicate general education credit in humanities.

100. **Fundamentals of Music Theory. 3 hours.** For the general student. Notation, metrical organization and rhythmic structure, scales and key signatures, intervals, triads, ear training, and sight singing. **F, W, S, Su**
101. **Theory of Music. 3 hours.** Summary of fundamentals of music theory, melodic analysis, introduction to harmony, and related keyboard drill. Prerequisites: Music major or minor or approval of the department; concurrent registration in Mus. 104 and 170. **F**
102. **Theory of Music. 3 hours.** Triads, dominant sevenths and their inversion; introduction to nonharmonic tones and elementary modulation; small two-part and three-part forms; harmonic analysis; related keyboard drill. Prerequisite. Mus. 101 or the equivalent. **W**
103. **Theory of Music. 3 hours.** Secondary dominants and nondominant sevenths, continuation of nonharmonic tones and modulation; larger binary and ternary forms; related harmonic analysis and keyboard drill. Prerequisite: Mus. 102 or the equivalent. **S**
104. **Ear Training. 1 hour.** The development of aural perception and sight-singing skills; material is correlated with that in Music 101. Prerequisite: Concurrent registration in Mus. 101. **F**
105. **Ear Training. 1 hour.** The development of aural perception and sight-singing skill; material is correlated with that in Music 102. Prerequisite: Mus. 104 or the equivalent. **W**
106. **Ear Training. 1 hour.** The development of aural perception and sight-singing skills; material is correlated with that in Music 103. Prerequisite: Mus. 105 or the equivalent. **S**
- \*130. **Introduction to Music I. 4 hours.** For the general student. May not be taken for credit by music majors or minors. Study of the principal elements of music; designed to develop an understanding of musical values. **F, S**

- \*131. Introduction to Music II. 4 hours.** For the general student. May not be taken for credit by music majors or minors. A survey of principal style periods and their chief forms. Prerequisite: Mus. 130. **W**
- 151. Concert Band. ½ hour.** Introduction to all types of band literature. Regular performances throughout the school year. Prerequisite: Consent of the instructor. **F, W, S**
- 152. Orchestra. ½ hour.** Instrumental ensemble; performance of important instrumental literature of varied types. Prerequisite: Consent of the instructor. **F, W, S**
- 153. Choir. ½ hour.** Introduction to important choral literature of all periods. Regular performances throughout the school year. Prerequisite: Consent of the instructor. **F, W, S**
- 154. Chamber Choir. ½ hour.** Select group of approximately 30 singers. Performance of music literature of all periods, composed for small ensembles. Prerequisite: Consent of the instructor. **F, W, S**
- 155. Madrigal Singers. ½ hour.** Small, very select group; performance of music literature primarily of the pre-Baroque periods. Prerequisite: Consent of the instructor. **F, W, S**
- 156. Chorus. ½ hour.** Ensemble singing primarily for average and beginning singers. Stress on choral technique and vocal development. Prerequisite: Consent of the instructor. **F, W, S**
- 158. Prep Band. ½ hour.** Designed for less experienced players who wish to meet required skills for concert band. Prerequisite: Consent of the instructor. **F, W, S**
- 170. Piano I. 2 hours.** Style and interpretation in performance; the development of keyboard skills in sight reading, transposition, improvisation, and ensemble playing. Must be repeated three times or until the minimum level of performance is certified by a departmental jury examination. No more than 6 credit hours may be earned. Prerequisites: Music major or minor and approval of the department. **F, W, S**
- 171. Piano II. 2 hours.** Continues Music 170. Must be repeated three times or until the minimum level of performance is certified by a departmental jury examination. No more than 6 credit hours may be earned. Prerequisite: Mus. 170 or approval of the department. **F, W, S**
- 201. Theory of Music. 3 hours.** Continuation of nondominant seventh chords; introduction to ninth, eleventh, thirteenth chords, and chromatic harmony; analysis of single-movement forms; harmonic analysis of music from the

eighteenth and early nineteenth centuries; related to keyboard drill. Prerequisite: Mus. 130 or the equivalent. **F**

- 202. Theory of Music. 3 hours.** Continuation of chromatic harmony; harmonic and structural analysis of music from the middle to the late nineteenth century; related keyboard drill. Prerequisite: Mus. 201 or the equivalent. **W**
- 203. Theory of Music. 3 hours.** Harmony from the late nineteenth to the early twentieth centuries; harmonic and structural analysis; related keyboard drill. Prerequisite: Mus. 202 or the equivalent. **S**
- 204. Ear Training. 1 hour.** The development of aural perception and sight-singing skills; material is correlated with that in Music 201. Prerequisite: Mus. 106 or the equivalent. **F**
- 205. Ear Training. 1 hour.** The development of aural perception and sight-singing skills; material is correlated with that in Music 202. Prerequisite: Mus. 204 or the equivalent. **W**
- 206. Ear Training. 1 hour.** The development of aural perception and sight-singing skills; material is correlated with that in Music 203. Prerequisite: Mus. 205 or the equivalent. **S**
- 207. Composition I. 4 hours.** Class and individual instruction in the basic techniques of musical composition. Practice in the construction of phrases and sentences leading to composition of music in the small forms. Prerequisites: Mus. 203 and 206. **W**
- 208. Composition II. 4 hours.** Continues instruction in the basic techniques of musical composition. Experience in writing works of moderate scope for vocal and instrumental combinations ranging from solo to small ensemble. Prerequisite: Mus. 207. **S**
- \*215. Opera. 4 hours.** May not be taken for credit by music majors or minors. Historical survey tracing the growth and development of opera from its beginnings to the present day. Prerequisite: Sophomore standing. **F**
- \*216. Chamber Music. 4 hours.** May not be taken for credit by music majors or minors. The growth and development of chamber music from the Baroque period to the present. Prerequisite: Sophomore standing. **W**
- \*217. The Symphony. 4 hours.** May not be taken for credit by music majors or minors. Historical survey of the growth and development of the symphony from its beginnings to the present. Prerequisite: Sophomore standing. **S**
- \*218. The Concerto. 4 hours.** May not be taken for credit by music majors or minors. Historical survey tracing the growth and development of the

concerto from its beginnings to the present day. Prerequisite: Sophomore standing. **F**

**\*219. The Keyboard Literature. 4 hours.** May not be taken for credit by music majors or minors. Historical survey tracing the growth and development of keyboard literature from Mozart through Debussy. Prerequisite: Sophomore standing. **W**

**\*220. Expressionism. 4 hours.** May not be taken for credit by music majors or minors. Expressionism as one reaction to the cultural crisis of the early twentieth century centering on the music of Schonberg, Berg, and Webern. Prerequisite: Sophomore standing. **S**

**230. Music History I. 4 hours.** Middle Ages and Renaissance. A general survey of music history from monophony to 1600. Prerequisites: Junior standing and Mus. 103. **F**

**231. Music History II. 4 hours.** Baroque and classical. A general survey of music history from 1600 to 1825. Prerequisite: Mus. 230. **W**

**232. Music History III. 4 hours.** Romantic and twentieth century. A general survey of music history from about 1825 to the present. Prerequisite: Mus. 231. **S**

**250. Music for Elementary Teachers. 4 hours.** Open only to students in the College of Education. Required for state elementary teaching certificates. Materials and methods for teaching basic music concepts through creating and reading music; playing instruments, listening, singing; body movement. Prerequisite: Mus. 100 or proficiency examination. **F, W, S**

**289. New Perceptions in Visual Arts, Music, and Science. 4 hours.** Same as Humanities 289. The extended sensory range of the twentieth century as represented in the visual arts, music, and science. Prerequisite: Sophomore standing.

**299. Individual Study. 1 to 6 hours.** May be repeated for credit for a maximum of 8 hours. Selected topics for individual investigation. Prerequisites: Mus. 203, 232, and approval of the department. **F, W, S, Su**

**300. Sixteenth-Century Counterpoint. 3 hours.** Late Renaissance music. Analysis of representative scores and written assignments in sixteenth century contrapuntal style. Prerequisites: Mus. 203 and 206 or approval of the department. **F**

**301. Eighteenth-Century Counterpoint. 3 hours.** Middle-to-late Baroque music. Analysis of representative scores and written assignments in eighteenth century contrapuntal style. Prerequisite: Mus. 300 or approval of the department. **W**

- 302. Form and Analysis.** 3 hours. The melodic, rhythmic, harmonic, and structural analytic procedures of traditional musical form. Analysis of representative scores from the eighteenth to the twentieth centuries. Prerequisite: Mus. 301. S
- 303. Compositional Techniques of the Twentieth Century.** 4 hours. European and American twentieth century music. Analysis of representative scores and written assignments in composition in one or more of the several contemporary idioms. Prerequisite: Mus. 302 or consent of the instructor.
- 330. Music as Experience.** 4 hours. Musical experience as found in the writings of theorists, composers, musicians, historians, critics, and philosophers. Prerequisites: Junior standing, Mus. 130, and one 200-level course in music.

## NATURAL SCIENCES (NatS)

Asterisks (\*) indicate general education credit in natural sciences.

- \*121. Natural Sciences — Physics.** 5 hours. A study of the physical universe for the non-science student. Physical laws and the nature of matter. Astronomy and cosmology. Prerequisite: High school algebra.

## PHILOSOPHY (Phil)

Asterisks (\*) indicate general education credit in humanities.

- \*101. Introduction to Philosophy.** 4 hours. Small-group conferences on assigned papers are required. Some of the more significant problems that arise in such philosophical disciplines as metaphysics, the theory of knowledge, and the philosophies of religion, science, and history.
- \*102. Elementary Logic.** 4 hours. Clarity and validity in argument; detection of fallacies; introduction to the use of symbolism in constructing proofs.
- \*103. Introduction to Ethics.** 4 hours. Small-group conferences on assigned papers are required. Examination of representative classical and modern ethical philosophies; their import for social and political thought.
- \*150. Classics in the Philosophy of Science.** 4 hours. Primary sources in the philosophy of science that have decisively influenced the development of modern science and Western thought since ancient times. Prerequisite: Sophomore standing.



- \*201. **Ancient Philosophy.** 4 hours. The development of Greek and Roman philosophy. Prerequisite: Junior standing or two courses in philosophy.
- \*202. **Medieval Philosophy.** 4 hours. Reading and discussion of selected philosophical works from St. Augustine through William of Ockham. Prerequisite: Junior standing or two courses in philosophy.
- \*203. **History of Modern Philosophy.** 4 hours. The development of Western philosophy from Descartes through Kant. Prerequisite: Junior standing or two courses in philosophy.
- \*206. **American Philosophy.** 4 hours. Main currents of philosophical thought in America. Prerequisite: One course in philosophy.
- \*210. **Philosophic Problems in Art and Art Appreciation.** 4 hours. The nature of good painting and the characteristics of the reasons that can be offered in support of critical evaluations of works of art.
- \*211. **Introduction to Formal Logic.** 4 hours. Elementary theory and methods of symbolic logic. Prerequisite: One course in philosophy or one course in mathematics.
- \*212. **Philosophy of Art.** 4 hours. Philosophical theories of art from ancient Greece to the present. Plato, Aristotle, Longinus, Hume, Kant, Nietzsche, Dewey, and others.
- \*214. **Philosophy of Religion.** 4 hours. Philosophical inquiry into the grounds of religious belief and the character of religious experience. Prerequisite: One course in philosophy.
- \*216. **Political and Social Philosophy.** 4 hours. Philosophical bases of social and political institutions and practices. The nature of the state; justice and law; rights and natural rights; social utility and public interest.
- \*222. **Introduction to the Philosophy of Science.** 4 hours. The nature of scientific explanation and verification. The status of scientific theories; induction and probable inference.
- \*224. **Philosophy of Education.** 4 hours. The nature and aims of education, the relationship of philosophical disciplines, such as ethics and theory of knowledge, to educational theory, and the application to pedagogy of various philosophical ideas and systems.
- \*235. **Studies in Existentialist Literature.** 4 hours. Same as Humanities 235. Imaginative works by Dostoevsky, Rilke, Sartre, and Camus; selections from Pascal, Kierkegaard, Nietzsche, Jaspers, and Tillich. Prerequisite: Junior standing or consent of the instructor.

- \*299. **Seminar. 4 hours.** May be taken twice. Selected topics. Prerequisites: Junior standing and approval of the department.
301. **Plato. 4 hours.** Selected dialogues. Prerequisite: Two courses in philosophy.
302. **Aristotle. 4 hours.** Reading and discussion of some of the basic works. Prerequisite: Two courses in philosophy.
304. **Seventeenth Century Rationalism. 4 hours.** Selected readings and discussion from the works of Descartes, Spinoza, Leibniz, and others. Prerequisite: Two courses in philosophy.
306. **British Empiricism. 4 hours.** Selected readings from the works of such philosophers as Locke, Berkeley, and Hume. Prerequisite: Two courses in philosophy.
308. **Kant. 4 hours.** Kant's philosophy, with emphasis on the **Critique of Pure Reason**. Prerequisite: Two courses in philosophy.
310. **Nineteenth Century and Early Twentieth Century Thought. 4 hours.** May be repeated for credit with the approval of the department. Studies of selections from the writings of Hegel, Schelling, Fichte, Schopenhauer, Marx and Engels, J. S. Mill, Nietzsche, McTaggart, Green, Bradley, Peirce, Perry, and others. Prerequisite: Two courses in philosophy.
311. **Inductive Logic. 4 hours.** Traditional and contemporary problems of induction. Inductive logic and the theory of probability. Prerequisite: Phil. 211 or consent of the instructor.
312. **Recent and Contemporary Philosophy: Analysis and Logical Empiricism. 4 hours.** Developments in recent philosophy which have their roots in the study of logic and language, such as logical atomism, positivism, and analytical philosophy. Prerequisite: Two courses in philosophy. Phil. 211 is recommended.
314. **Recent and Contemporary Philosophy: Phenomenology and Existential Philosophy. 4 hours.** Important contributions to the phenomenological movement. Selected readings from Husserl, Heidegger, Jaspers, Sartre, Merleau-Ponty and others. Prerequisite: Two courses in philosophy.
321. **Introduction to Formal Logic. 4 hours.** Four meetings per week coincide with Philosophy 211 (see Philosophy 211 description). One additional meeting per week devoted to an introduction to elementary set theory plus extra topics related to work in Philosophy 211.
322. **Problems in the Foundations of Logic and Mathematics. 4 hours.** A survey of selected problems. Prerequisite: Phil. 211 or the equivalent.

330. **Theory of Knowledge. 4 hours.** The grounds of belief; the nature of truth; evidence and proof; other related epistemological problems. Prerequisite: Two courses in philosophy, one of which must be a 200-level course.
332. **Ethics and Value Theory. 4 hours.** The nature of moral judgments and moral reasoning; ethics as a normative discipline; definitions of "value"; ethical judgments as a kind of value judgment. Prerequisite: Two courses in philosophy, one of which must be a 200-level course.
334. **Aesthetics. 4 hours.** The aesthetic object. Form, representation, and meaning in art. Art and knowledge. Prerequisite: Philosophy 212 is recommended.
336. **Topics in Metaphysics. 4 hours.** Systematic analysis of selected metaphysical concepts, such as existence, substance and attribute, universals and particulars, change, identity, space and time, and the individual. Recent as well as traditional points of view are considered. Prerequisite: Two courses in philosophy one of which must be a 200-level course.
338. **Philosophical Analysis of the Concept of Mind. 4 hours.** Presuppositions and logical interconnections involved in the use of such terms as "mind," "thought," "action," "intention," and "will." Prerequisite: Two courses in philosophy, one of which must be a 200-level course.
340. **Philosophy of Language. 4 hours.** Philosophical and logical problems concerned with the nature of meaning and the structure of language. Prerequisite: Phil. 211 or 343, or some demonstration of familiarity with the techniques of symbolic logic. In the last case, consent of the instructor is required.
343. **Formal Logic I. 4 hours.** Same as Mathematics 343. Propositional logic, logic of quantifiers, and identity and completeness. Prerequisite: Consent of the instructor; none for mathematics majors.
344. **Formal Logic II. 4 hours.** Same as Mathematics 344. Continues Philosophy 343. Mathematical analysis of decidability and computability. Arithmetization of syntax. Incompleteness and undefinability theorems. Introduction to axiomatic set theory. Prerequisite: Philosophy 343.
345. **Philosophical Problems of the Sciences. 4 hours.** May be repeated for credit with the permission of the department. Reading and discussion of selected works on the aims and methods of science, the status of scientific theories, natural laws and theoretical entities, and the nature of explanation. Prerequisite: Two courses in philosophy, one of which must be a 200-level course.
347. **Philosophy of Law. 4 hours.** Problems in the philosophy of law. Prerequisite: Two courses in philosophy.

351. **Problems in the Philosophy of Mathematics.** 4 hours. Intensive study of a particular problem or nexus of problems in the philosophy of mathematics. The problems will vary from quarter to quarter. Prerequisite: Philosophy 343 or consent of the instructor; none for mathematics majors.
399. **Independent Study.** 1 to 8 hours. Independent study, under the supervision of a staff member, of a topic not covered in the regular curriculum. The course is offered at the request of the student and only at the discretion of the staff members concerned. Prerequisite: Approval of the department.

## PHYSICAL EDUCATION FOR MEN (PEM)

101. **Prescribed Exercises.** 1 hour. May be repeated for a total of 6 hours. Exercises adapted to individual needs, capacities, and interests. Open only to students assigned by the Health Service.
106. **Developmental Activities.** 1 hour. Development and maintenance of physical fitness according to social and hygienic standards.
107. **Beginning Swimming.** 1 hour. Skills, knowledge, attitudes, and conditions. Open only to nonswimmers.
108. **Intermediate Swimming and Water Polo.** 1 hour. Improvement of swimming skills of those who swim inefficiently; development of skills necessary to play water polo reasonably well. Prerequisite: Ability to swim 50 yards.
109. **Advanced Swimming and Diving.** 1 hour. Development of skill in competitive swimming strokes and diving. Prerequisite: Ability to swim 200 yards.
110. **Life Saving and Skin Diving.** 1 hour. For students who wish to learn life saving skills and to develop the fundamental skills and knowledge for skin diving. The American Red Cross Senior Life Saving Certificate is awarded upon successful completion of the course. Prerequisite: Ability to swim, for 100 yards, three of these four strokes: back, breast, crawl, and side.
112. **Individual Tumbling Stunts.** 1 hour. Skill, knowledge, attitudes, and conditions.
113. **Double Tumbling Stunts.** 1 hour. Skills, knowledge, attitudes, and conditions.
114. **Apparatus Stunts.** 1 hour. Skills, knowledge, attitudes, and conditions.
115. **Circus Stunts.** 1 hour. Skills, knowledge, attitudes, and conditions.

116. **Saber Fencing.** 1 hour. Skills, knowledge, attitudes, and conditions. Prerequisite: PEM 119 with a grade of C or better or consent of the instructor.
117. **Boxing.** 1 hour. Skills, knowledge, attitudes, and conditions.
118. **Wrestling.** 1 hour. Skills, knowledge, attitudes, and conditions.
119. **Foil Fencing.** 1 hour. Skills, knowledge, attitudes, and conditions.
120. **Personal Defense Activities.** 1 hour. Skills, knowledge, attitudes, and conditions.
121. **Weight Training.** 1 hour. A program of weight training that contributes to improvement in strength and fitness. Prerequisite: Recommendation of the staff.
122. **Individual Athletics.** 1 hour. Skills, knowledge, attitudes, and conditions.
123. **Weight Lifting.** 1 hour. Skills, knowledge, attitudes, and conditions.
124. **Track and Field Athletics.** 1 hour. Skills, knowledge, attitudes, and conditions.
125. **Flickerball.** 1 hour. Skills, knowledge, attitudes, and conditions.
126. **Touch Football.** 1 hour. Skills, knowledge, attitudes, and conditions.
127. **Softball.** 1 hour. Skills, knowledge, attitudes, and conditions.
128. **Soccer.** 1 hour. Skills, knowledge, attitudes, and conditions.
129. **Volleyball.** 1 hour. Skills, knowledge, attitudes, and conditions.
130. **Basketball.** 1 hour. Skills, knowledge, attitudes, and conditions.
131. **Speedball.** 1 hour. Skills, knowledge, attitudes, and conditions.
132. **Archery.** 1 hour. Skills, knowledge, attitudes, and conditions.
133. **Squash Racquets.** 1 hour. Skills, knowledge, attitudes, and conditions.
134. **Handball.** 1 hour. Skills, knowledge, attitudes, and conditions.
135. **Tennis.** 1 hour. Skills, knowledge, attitudes, and conditions.
136. **Badminton.** 1 hour. Skills, knowledge, attitudes, and conditions.



- 137. **Bowling.** 1 hour. Skills, knowledge, attitudes, and conditions.
- 138. **Golf.** 1 hour. Skills, knowledge, attitudes, and conditions.
- 139. **Backyard Sports.** 1 hour. Skills, knowledge, attitudes, and conditions.
- 140. **Boating and Fishing.** 1 hour. Skills, knowledge, attitudes, and conditions.
- 142. **Ballroom Dance.** 1 hour. Same as PEW 142. The techniques of social dancing.
- 143. **American Square Dance.** 1 hour. Same as PEW 143. Basic rhythms of square dance, etiquette and terminology, relation of round dances to American square dancing, appreciation of square dancing, several well-known American squares.
- 144. **Folk Dance—Elementary.** 1 hour. Same as PEW 144. Traditional rhythms of various countries, appreciation of the background.
- 145. **Modern Jazz I.** 1 hour. Same as PEW 145. Modern jazz development through creativity and structured movement.
- 170. **Fundamentals of Baseball.** 4 hours. Skills, knowledge, attitudes, and conditions. Required for physical education majors. **F, S**
- 171. **Fundamentals of Basketball.** 4 hours. Skills, knowledge, attitudes, and conditions. Required for physical education majors. **W, S**
- 172. **Fundamentals of Football.** 4 hours. Skills, knowledge, attitudes, and conditions. Required for physical education majors. **F, S**
- 173. **Fundamentals of Gymnastics.** 2 hours. Skills, knowledge, attitudes, and conditions. Required for physical education majors. **F, W**
- 174. **Fundamentals of Swimming.** 4 hours. Skills, knowledge, attitudes, and conditions. Required for physical education majors. **W, S**
- 175. **Fundamentals of Track and Field Athletics.** 4 hours. Skills, knowledge, attitudes, and conditions. Required for physical education majors. **F, S**
- 176. **Fundamentals of Wrestling.** 4 hours. Skills, knowledge, attitudes, and conditions. Required of physical education majors. **F, W**
- 177. **Fundamentals of Special Activities.** 2 hours. Field sports and bowling. Skills, knowledge, attitudes, and conditions. Required for physical education majors. **F, S**

178. **Fundamentals of Special Activities.** 2 hours. Badminton, volleyball, and tennis. Skills, knowledge, attitudes, and conditions. Required for physical education majors. **F, S**
179. **Archery, Handball, Golf.** 2 hours. Skills, knowledge, attitudes, and conditions. Required for physical education majors. **F, S**
180. **Fitness Programs.** 4 hours. Fundamental skills, knowledge, and practice of physical conditioning. Required for physical education majors. **F, W**
185. **Introduction to Physical Education.** 3 hours. Physical education, health education, recreation, and related fields. Required for physical education majors. **F, W, S**
188. **History of Sports.** 4 hours. Development of sports and physical education in Europe and the United States since 1750. Required for physical education majors. **W, S**
190. **Principles of Recreation.** 4 hours. History of leisure and recreation; concepts of play and recreation; major recreation agencies.
191. **Camp Counseling.** 4 hours. The history and development of organized camping; examination of camp administrative organization; the role of the counselor. Analysis of program content and development; the nature and scope of counseling and guidance in relation to common camp behavior problems.
250. **Kinesiology.** 5 hours. Mechanics and muscular action of balance and movement of the human body and their applications. Required for physical education majors. Prerequisite: BioS. 133. **F, W**
251. **The Physiology of Muscular Activity.** 4 hours. The physiological mechanisms associated with physical exercise. Required for physical education majors. Prerequisite: BioS. 134. **F, W**
252. **The Theory of Prescribed Exercise.** 4 hours. Prescription and conduct of recreational and exercise programs for selected physical handicaps. Required for physical education majors. Prerequisite: BioS. 134. **F, W**
253. **Tests and Measurements in Physical Education.** 4 hours. The application of tests and measurements to physical education. The development of tests. Required for physical education majors. Prerequisite: PEM 185. **W, S**
255. **First Aid and the Prevention and Care of Athletic Injuries.** 4 hours. American Red Cross First Aid. Diagnostic procedures for athletic injuries; treatment. Required for physical education majors. Prerequisite: BioS. 134. **W, S**

260. **The Organization of Physical Education Programs.** 3 hours. The high school physical education program. Required for physical education majors. Prerequisite: PEM 185. F, S
261. **The Organization of Athletic Programs.** 3 hours. The organization and administration of interscholastic athletic competition. Required for physical education majors. Prerequisite: PEM 185. F, S
262. **The Organization and Administration of Intramural Sports Programs.** 3 hours. Required for physical education majors. Prerequisite: PEM 185. W, S
280. **Student Coaching.** 4 hours. Coincides with student teaching. Preparation for, and supervised experience in, the field of coaching. Prerequisite: Concurrent registration in Ed. 270.

## PHYSICAL EDUCATION FOR WOMEN (PEW)

100. **Conditioning Activities.** 1 hour. Maintenance and improvement of physical fitness through exercise and body control.
102. **Modified Activities.** 1 hour. For students assigned by Health Service. Students with physical disabilities participate according to their abilities.
105. **Elementary Rhythms.** 1 hour. Fundamentals of creative dance as an art form; rhythm, space, and quality factors; principles of art; exploration and movement discovery for creative dance composition.
106. **Intermediate Rhythms.** 1 hour. Advanced work in the fundamentals of dance as an art form; rhythm, space, and quality factors; principles of art; group and solo dance compositions.
107. **Apparatus.** 1 hour. Vaulting over side horse; basic skills and routines for uneven bars and balance beam.
108. **Free Exercise.** 1 hour. Components of free exercise: basic ballet, locomotor patterns, and tumbling; their use in routines.
110. **Beginning Swimming.** 1 hour. For students who are afraid of the water and unable to float or to swim. Water adjustment, floating, front crawl, and back crawl.
111. **Advanced Beginning Swimming.** 1 hour. Front crawl, back crawl, elementary back stroke, treading, floating, and plain front dive. Prerequisite: Front and back float.

112. **Intermediate Swimming. 1 hour.** Side stroke, breast stroke, surface dive. Review of front and back crawl and elementary back stroke. Prerequisite: Ability to swim one pool length (25 yards) each of the front crawl, the back crawl, and the elementary back stroke.
113. **Advanced Swimming. 1 hour.** Springboard dive, all basic swimming strokes, and the butterfly. Emphasis on endurance. Some racing techniques and synchronized swimming. Prerequisite: Ability to swim 25 yards of the front crawl, back crawl, elementary back stroke, breast stroke, and side stroke.
115. **Synchronized Swimming. 1 hour.** The practice and presentation of strokes, stunts, sculling, and composition. Prerequisite: Intermediate swimming ability.
116. **Beginning Diving. 1 hour.** Springboard dive, back dives, somersault and twisting dives. Prerequisite: Ability to swim and execute plain front dive from the side of the pool.
117. **Senior Life Saving. 1 hour.** Lifesaving and swimming skills for those interested in working in the field of aquatics. Prerequisites: Ability to execute a surface dive and to swim three strokes for 200 yards in good form.
118. **Advanced Synchronized Swimming. 1 hour.** Practice and presentation of strokes and advanced synchronized swimming skills; emphasis on creativity. Prerequisite: PEW 115 or consent of the instructor.
120. **Elementary School Game, Self Testing, and Rhythmic Skills. 2 hours.** Analysis and development of skills used in the physical education program in the elementary school. Prerequisite: Sophomore standing.
122. **Speedball. 1 hour.** Fundamentals of team play based on the development of individual game skills.
123. **Basketball. 1 hour.** Skills and knowledge in beginning basketball.
124. **Volleyball. 1 hour.** Development of skill in volleyball play, knowledge of rules, refereeing.
125. **Softball. 1 hour.** Skills and knowledge.
126. **Field Hockey. 1 hour.** Skills, rules, and strategy.
127. **Soccer. 1 hour.** Skills, rules, and strategy.
128. **Advanced Volleyball. 1 hour.** Advanced techniques and team play. Prerequisite: PEW 124 or consent of the instructor.

130. **Badminton. 1 hour.** Development of badminton skills, knowledge of rules, tournament play.
131. **Beginning Golf. 1 hour.** Historical development, values, rules, etiquette, and skill techniques. Use of woods, irons, and putters.
132. **Bowling. 1 hour.** Development of skills.
133. **Fencing. 1 hour.** Fundamentals of foil fencing: mechanical principles, body movements, competition strategy. Prerequisite: PEW 100.
134. **Intermediate Fencing. 1 hour.** Skills, rules, tactics, officiating techniques, and competition. Prerequisite: PEW 133 or consent of the instructor.
135. **Archery. 1 hour.** Knowledge, skills, and practice.
136. **Tennis. 1 hour.** Development of tennis skills, knowledge of rules, tournament play, and procedures.
137. **Advanced Tennis. 1 hour.** Advanced skills. Emphasis on singles and doubles strategy. Prerequisite: PEW 136 or consent of the instructor.
138. **Track and Field. 1 hour.** Basic track and field knowledge and skills.
141. **Stunts, Tumbling, and Apparatus. 1 hour.** Simple stunts and tumbling. Basic and intermediate levels of use on horse, buck, parallel bars, trampoline, and balance beam.
142. **Ballroom Dance. 1 hour.** Same as PEM 142. The techniques of social dancing.
143. **American Square Dance. 1 hour.** Same as PEM 143. Basic rhythms of square dance, etiquette and terminology, relation of round dances to American square dancing, appreciation of square dancing, several well-known American squares.
144. **Folk Dance—Elementary. 1 hour.** Same as PEM 144. Traditional rhythms of various countries, appreciation of the background.
145. **Modern Jazz I. 1 hour.** Same as PEM 145. Modern jazz development through creativity and structured movement.
146. **Ballet I. 1 hour.** An introduction to classical ballet: basic techniques and terminology, appreciation, and historical development.
150. **Professional Orientation. 3 hours.** To introduce physical education majors to the historical highlights, role of physical education in modern society,



basic philosophical and scientific principles upon which the profession is founded, and to acquaint the student with professional organizations, literature, and career opportunities.

151. **Body Mechanics and Basic Movement. 1 hour.** Mechanics of body stabilization and movement; applications. Does not satisfy the general education requirement.
152. **Soccer and Speedball. 1 hour.** Skill techniques, rules, and basic techniques of officiating; strategy; movement analysis. Does not satisfy the general education requirement.
153. **Stunts and Tumbling. 1 hour.** Basic skills, routines, practice, and teaching methods. Does not satisfy general education requirement.
154. **Volleyball, Track, and Field. 1 hour.** Basic skills, techniques, tournament play, and volleyball officiating. Basic skills of track and field activities; shot, ball throwing, and running activities. Does not satisfy the general education requirement.
155. **Gymnastics and Apparatus I. 1 hour.** Skill, practice, and movement analysis. Does not satisfy the general education requirement.
156. **Swimming II. 1 hour.** Advanced skills with emphasis on teaching progressions. Does not satisfy the general education requirement. Prerequisite: PEW 110, 111, 112, 113 or 115.
157. **Basketball I and Softball. 1 hour.** Skills, rules, and tactics in beginning basketball and softball; movement analysis. Does not satisfy the general education requirement.
159. **Basketball II and Field Hockey. 1 hour.** Skill techniques; rules and basic techniques of officiating; strategy; movement analysis. Does not satisfy the general education requirement. Prerequisite: PEW 157 or consent of the instructor.
166. **Elementary School Games. 3 hours.** For kindergarten through eighth grade playground and gymnasium activities. Program planning, lesson planning, and source materials. Open only to physical education majors.
168. **Gymnastics and Apparatus II. 1 hour.** Intermediate and advanced skills and routines. Does not satisfy the general education requirement. Prerequisite: PEW 155.
190. **Introduction to Recreation. 3 hours.** Analysis of the structure and function of the recreation of man: its philosophy, concepts, and trends. Institutionalized recreation leadership, activities, and programs.

195. **Outdoor Recreation. 4 hours.** Philosophy and principles underlying the methods and programs in outdoor recreation activities and events; special emphasis on outdoor education and enriching the leisure time program.
200. **Teaching of Dance and Gymnastics. 4 hours.** Foundations of learning rhythmic and gymnastic activities, teaching techniques, evaluation procedures, resource and teaching aids. Prerequisites: PEW 151 and Dance 100.
201. **Archery and Golf. 2 hours.** Elements of the skills, rules, and analysis of movement; opportunity for individual practice in game techniques. Does not satisfy the general education requirement.
202. **Theory and Practice of Rhythmic Gymnastics. 2 hours.** May be repeated for credit with approval of the department. Theory of European gymnastic systems. Applications of techniques of rhythmic gymnastics with light hand apparatus. Emphasis on systems studied will vary. Prerequisite: PEW 151.
203. **Badminton and Tennis. 2 hours.** Elements of the skills, rules, techniques of refereeing, and analysis of movement. Does not satisfy the general education requirement.
204. **Supervised Teaching of Dance and Gymnastics. 2 hours.** Laboratory experience in general education physical education classes designed to give the student supervised observation and teaching experience in techniques, methods, and class management in dance or gymnastics under close supervision and guidance of staff members. Assignment to classes by arrangement. Prerequisites: PEW 151, 155, 168; Dance 100 and 235.
205. **Tests and Measurements. 4 hours.** Laboratory experience designed to instruct the student in evaluation techniques for assessing skill, knowledge, motor achievement, physical fitness status. Elementary techniques of test construction, statistical methods, and research procedures. Prerequisite: Junior standing.
213. **Teaching of Sports. 4 hours.** Relation of the teaching of sports to fundamental educational and psychological principles. Methods and materials for class management, sport instruction and construction of unit and lesson plans. Prerequisites: PEW 151, 152, and 154 or consent of the instructor.
214. **Supervised Teaching of Sports. 1 hour.** Laboratory experience teaching in the general education physical education classes under the direct supervision of the staff. Designed to give the student guided opportunities to observe and acquire experience in technique, methods, and class management. Assignment of classes by arrangement. Prerequisites: PEW 151, 152 154, and 213, or consent of the instructor.
220. **Elementary School Games and Self-Testing Activities. 2 hours.** For ele-

mentary education majors. Methods and materials applicable to all elementary grades. Prerequisite: Junior standing.

221. **Elementary School Rhythmic Activities. 2 hours.** For elementary education majors. Methods and materials applicable to all elementary grades. Prerequisite: Junior standing.
222. **Physical Education in the Elementary and Secondary School. 3 hours.** Curriculum planning, teaching methods, activities for different age groups, evaluation of materials, and organization for presentation. Prerequisites: PEW 166, Dance 100 and 235.
230. **Kinesiology. 5 hours.** Analysis of the mechanics of movement and muscular action and their relationship to human movement and balance. Prerequisites: BioS. 134, PEW 151.
231. **Adapted Physical Education. 4 hours.** A study of handicapping conditions found among students. Adaptation of exercises and activities to individual needs. Program planning. Prerequisite: PEW 230.
250. **Organization and Administration of Physical Education. 4 hours.** Problems, evaluation, methods, and procedures of administration of school activities at various age levels. Individual projects are required. Prerequisite: Senior standing or consent of the instructor.
280. **The History of Sports. 4 hours.** Historical development of current sports, the role sports have played in the cultures of the world; political and economic factors on practices in the conduct of sports. Prerequisite: Consent of the instructor.
281. **First Aid. 4 hours.** Safety and accident prevention in schools, playgrounds, and communities. American Red Cross procedures for administering first aid.
282. **The Organization of the School Health Program. 4 hours.** The development of school health programs, the function and use of health sciences, healthful school living, the problems and needs of school children. Individual projects are required.
283. **The History of Philosophy of Physical Education. 4 hours.** The developmental changes in the philosophy of physical education as influenced by historical changes in society and culture. Individual projects are required. Prerequisite: Senior standing or consent of the instructor.

## PHYSICAL SCIENCES (PSci)

Asterisks (\*) indicate general education credit in natural sciences.

- \*101. **Physical Science. 4 hours.** Together with Physical Science 102 and 103 (either may precede the other), an introduction to the principles of the physical sciences. **F, W, S, Su**
- \*102. **Physical Science. 4 hours.** Continues Physical Science 101. Prerequisite: PSci. 101. **W, Su**
- \*103. **Physical Science. 4 hours.** Continues Physical Science 101. Prerequisite: PSci. 101. **F, S**
- 299. **Topics in the Physical Sciences. 2 to 4 hours.** Credit will be determined by the number of meetings and attended scope of work as shown in the timetable. A colloquium intended to deepen understanding of the interrelations, effects, and choices created by large-scale science. Prerequisites: Superior standing and consent of the instructor.

## PHYSICS (Phys)

Asterisks (\*) indicate general education credit in natural sciences.

- \*101. **General Physics (Mechanics and Heat). 5 hours.** For students in Liberal Arts and Sciences and in Architecture. Dynamics of solids and heat. Lectures with demonstrations and recitations; laboratory. Prerequisite: Trigonometry. **F**
- \*102. **General Physics (Electricity, Magnetism, and Waves). 5 hours.** For students in Liberal Arts and Sciences and in Architecture. Electricity and magnetism, particles and fields, electromagnetic waves, and behavior of waves. Lectures with demonstrations and recitations; laboratory. Prerequisite: Phys. 101. **W**
- \*103. **General Physics (Modern Physics). 5 hours.** For students in Liberal Arts and Sciences and in Architecture. Relativity, quantum mechanics, atomic structure, and the nucleus. Lectures with demonstrations and recitations; laboratory. Prerequisite: Phys. 102. **S, Su**
- 111. **General Physics I (Mechanics). 4 hours.** Scalars and vectors; kinematics in one and two dimensions, conservation of momentum; Newton's laws; inertial systems, circular motion; work, potential energy, conservation of energy; harmonic motion. Lecture and discussion. Prerequisite: Credit or registration in Math. 131. **F, W, S, Su**
- 112. **General Physics II (Mechanics, Thermodynamics). 5 hours.** Angular momentum, moment of inertia; gravitational force, planetary motion; introduction to the physics of fluids; first and second laws of thermodynamics; the ideal

gas; kinetic theory of gases. Lecture, discussion, and laboratory. Prerequisites: Phys. 111 and credit or registration in Math. 132. **F, W, S, Su**

113. **General Physics III (Electricity and Magnetism).** 5 hours. Coulomb's law, Gauss' law; electrostatic field, potential; capacitance, resistance, D. C. circuits; the magnetic force, Biot-Savart law, Ampere's law; motion of charged particles in electromagnetic fields; electromagnetic induction. Lecture, discussion, and laboratory. Prerequisites: Phys. 112 and credit or registration in Math. 113. **F, W, S, Su**
114. **General Physics IV (Wave Phenomena and Relativity).** 5 hours. Displacement current, Maxwell's equations; basic wave behavior; the wave equation; sound, water, and electromagnetic waves; reflection, refraction, interference, diffraction; geometrical optics; introduction to the special theory of relativity. Lecture, discussion, and laboratory. Prerequisite: Phys. 113. **F, W, S, Su**
- \*209. **Introduction to Astronomy.** 4 hours. Same as Geography 209. An introductory and essentially non-mathematical course for superior students who are not science majors. Prerequisite: Consent of the instructor.
221. **Modern Physics.** 4 hours. Kinetic theory, atomic nature of matter; thermal radiation, photons, photoelectric effect; atomic spectra, Bohr model of the atom; wave and particle aspects of matter; elements of nuclear and particle physics. Lecture and discussion. Prerequisite: Phys. 114. **F, S**
222. **Modern Physics Laboratory.** 1 hour. Experiments in modern physics including the photoelectric effect, Franck-Hertz experiment, radioactive decays, and others. Laboratory. Prerequisite: Phys. 221. **W**
301. **Electricity and Magnetism I.** 4 hours. Credit is not given to engineering majors. Applications of and problems in circuit theorems, electric fields, capacitance, energy, and forces associated with these fields in free space and in matter. Prerequisite: Credit or registration in Phys. 114 and Math. 321. **F**
302. **Electricity and Magnetism II.** 4 hours. Credit is not given to engineering majors. Applications of and problems in circuit theorems, magnetic fields, inductance, energy, and forces associated with these fields in free space and matter, electromagnetic induction, Maxwell's equations. Prerequisite: Phys. 301. **W**
303. **Electricity and Magnetism III.** 4 hours. Effects associated with changing fields and currents, transients, coupled circuits, filters, transmission lines, electromagnetic waves, circuit theorems in transient and steady state analysis. Prerequisite: Phys. 302. **S**



- 304. Electronics I. 4 hours.** Theory of electronic devices, linear and nonlinear analysis, applications of vacuum and semiconductor devices to circuits, amplifiers, biasing, feedback, oscillators, and special circuits. Prerequisite: Phys. 301. Phys. 302 and 303 are recommended. **F**
- 305. Electronics II. 4 hours.** Pulse-shaping networks, logic circuits, control circuits, distributed amplifiers, special problems of transducers, special signal-to-noise techniques. Prerequisite: Phys. 304.
- 321. Atomic Physics. 4 hours.** Individual projects are required. The properties of free electrons and ions, photons and their interaction with matter, atomic spectra and structure, introduction to quantum mechanics. Prerequisite: Phys. 114. Credit or registration in Math. 321 is recommended. **W**
- 322. Atomic and Molecular Physics. 4 hours.** Individual projects are required. Diatomic molecules; vibrational spectra, potential energy curves, chemical bonding, band structure. Polyatomic molecules; Raman, infrared, rotational, and microwave spectra, force fields and chemical bonding. Prerequisite: Phys. 321. **S**
- 323. Elementary Solid State Physics. 4 hours.** Individual projects are required. Crystal structure, thermal and dielectric properties of solids, free electron model of metals, band theory, semiconductor physics, dislocations and strength of solids. Prerequisite: Phys. 322. **F, Su**
- 331. Nuclear Physics. 4 hours.** Individual projects are required. Natural and artificial radioactivity, equipment for studying and producing high energy particles, nuclear disintegrations, interaction of nuclear particles with each other and with matter, cosmic rays, mesons, recent developments in high energy physics. Prerequisite: Phys. 321. **S**
- 341. Theoretical Mechanics I. 4 hours.** No credit for graduate Physics majors. Individual projects are required. Motion of a particle in one, two, and three dimensions, Kepler's laws and planetary motion, scattering of particles, conversion between laboratory and center of mass coordinate systems, conservation laws, motion of a rigid body in two dimensions. Prerequisites: Phys. 114 or approval of the department, and Math. 220. **F, Su**
- 342. Theoretical Mechanics II. 4 hours.** Individual projects are required. Statics of extended systems, moving coordinate frames, fictitious forces and conservation laws, special theory of relativity, mechanics of continuous media. Prerequisite: Phys. 341. **W, S, Su**
- 343. Theoretical Mechanics III. 4 hours.** Individual projects are required. Rigid-body motion in three dimensions, motion in gravitational fields, generalized coordinates and Lagrange and Hamilton equations, equations of constraint, small vibration theory. Prerequisite: Phys. 342. **S**

- 361. Thermal and Statistical Physics I. 4 hours.** Individual projects are required. Systems of particles, systems in equilibrium, laws of thermodynamics, thermal properties, application to simple physical and chemical systems, phase transitions, introduction to statistical mechanics. Prerequisite: Phys. 321. **W**
- 362. Thermal and Statistical Physics II. 4 hours.** Individual projects are required. Quantum statistics of ideal gases, magnetism and low temperatures, kinetic theory of transport processes, irreversible processes and fluctuations. Prerequisite: Phys. 361. **S**
- 371. Light (Wave Optics). 4 hours.** Wave propagation and Maxwell's equations, interference and interferometers, gratings, circular aperture, echelon, resolving power. Lecture and laboratory. Prerequisites: Phys. 114 and credit or registration in Math. 220. **F**
- 372. Light (Modern Optics I.) 4 hours.** Crystals, polarized light, optics of metals, quantum theory of radiation, transition probability and oscillator strength, dispersion and scattering theory. Lecture and laboratory. Prerequisite: Phys. 371.
- 373. Light (Modern Optics II). 4 hours.** Individual projects are required. Gaussian optics and general laws, special optical systems and applications. Image formation, finite image-error theory, spot diagrams. Necessary mathematical tools for Fourier analysis and transfer functions. Prerequisite: Phys. 372.
- 381. Modern Experimental Physics I. 4 hours.** Techniques and experiments in the physics of atoms, atomic nuclei, molecules, the solid state, and other areas of modern physical research. Lecture and laboratory. Prerequisites: Phys. 304 and 331. **W, Su**
- 382. Modern Experimental Physics II. 4 hours.** Continues Physics 381. Lecture and laboratory. Prerequisite: Phys. 381. **S**
- 391. Seminar. 1 hour.** Topics to be arranged. Prerequisite: Consent of the instructor.
- 392. Undergraduate Research. 2 to 4 hours.** Research under the close supervision of a faculty member. Prerequisite: Consent of the instructor.
- 393. Special Problems. 2 to 4 hours.** Special problems or reading by special arrangement with the faculty. Prerequisites: Senior standing and consent of the instructor.

**PLASTIC AND GRAPHIC ARTS (PGA)**

201. **Colloquium. 1 hour.** Current problems in the plastic and graphic arts presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: Completion of the foundation program.
202. **Intermediate Drawing and Painting. 2 hours.** Various media. Prerequisite: Completion of the foundation program.
203. **Intermediate Painting. 3 hours.** Theories and practices of color and color phenomena; pigment, light, and spatial illusion. Prerequisite: Completion of the foundation program.
204. **Intermediate Painting. 4 hours.** Object imagery, spatial relationships, and emotional, analytical, and psychological content in various media. Prerequisite: Completion of the foundation program.
205. **Intermediate Painting. 5 hours.** Abstract painting; theories of spatial organization, optical phenomena, experimental employment of various media. Prerequisite: Completion of the foundation program.
206. **Colloquium. 1 hour.** Current problems in the plastic and graphic arts presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: PGA 201.
207. **Intermediate Painting. 2 hours.** Continues PGA 202. Various media. Prerequisite: PGA 202.
208. **Intermediate Painting. 3 hours.** Continues PGA 203. Theories and practices of color and color phenomena; pigment, light, and spatial illusion. Prerequisite: PGA 203.
209. **Intermediate Painting. 4 hours.** Continues PGA 204. Object imagery, spatial relationships, and emotional, analytical and psychological content in various media. Prerequisite: Any one of PGA 202, 203, 204, 205.
210. **Intermediate Painting. 5 hours.** Continues PGA 205. Abstract painting; theories of spatial organization, optical phenomena, experimental employment of various media. Prerequisite: PGA 205.
211. **Colloquium. 1 hour.** Current problems in the plastic and graphic arts presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: PGA 206.

212. **Intermediate Painting. 2 hours.** Continues PGA 207. Various media. Prerequisite: PGA 207.
213. **Intermediate Painting. 3 hours.** Continues PGA 208. Theories and practices of color and color phenomena; pigment, light, and spatial illusion. Prerequisite: PGA 208.
214. **Intermediate Painting. 4 hours.** Continues PGA 209. Object imagery, spatial relationships, and emotional, analytical, and psychological content in various media. Prerequisite: Any one of PGA 207, 208, 209, 210.
215. **Intermediate Painting. 5 hours.** Continues PGA 210. Abstract painting: theories of spatial organization, optical phenomena, experimental employment of various media. Prerequisite: PGA 210.
216. **Colloquium. 1 hour.** Current problems in the plastic and graphic arts presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: PGA 211.
217. **Advanced Painting. 2 hours.** Theory and practice involving the integration of object imagery and abstract concepts. Prerequisite: PGA 212.
220. **Advanced Painting. 5 hours.** Comprehensive-project oriented. Prerequisite: PGA 215.
221. **Colloquium. 1 hour.** Current problems in the plastic and graphic arts presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: PGA 216.
222. **Advanced Painting. 2 hours.** Continues PGA 217. Theory and practice involving the integration of object imagery and abstract concepts. Prerequisite: PGA 217.
223. **Advanced Painting. 3 hours.** Synthesizing object imagery and abstract concepts, with emphasis on spatial analysis and color in various media. Prerequisite: PGA 217 or 220.
225. **Advanced Painting. 5 hours.** Continues PGA 220. Comprehensive project oriented. Prerequisite: PGA 217 or 220.
226. **Colloquium. 1 hour.** Current problems in the plastic and graphic arts presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: PGA 221.

227. **Advanced Painting. 2 hours.** Continues PGA 222. Theory and practice involving the integration of object imagery and abstract concepts. Prerequisite: Any one of PGA 222, 223, 225.
228. **Advanced Painting. 3 hours.** Continues PGA 223. Synthesizing object imagery and abstract concepts with emphasis on spatial analysis and color in various media. Prerequisite: Any one of PGA 222, 223, 225, 324, 325.
230. **Advanced Painting. 5 hours.** Continues PGA 225. Comprehensive project oriented. Prerequisite: Any one of PGA 222, 223, 225.
231. **Colloquium. 1 hour.** Current problems in the plastic and graphic arts presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: Completion of the foundation program.
232. **Intermediate Sculpture. 2 hours.** Principles of kinetic sculpture through various means and materials. Prerequisite: Completion of the foundation program.
233. **Intermediate Sculpture. 3 hours.** Object oriented; emphasis on forming processes and materials. Includes preparatory drawings and sketches. Prerequisite: Completion of the foundation program.
234. **Intermediate Sculpture. 4 hours.** Comprehensive sculpture, stressing form and shape concepts. Methods of addition and extension in various media. Prerequisite: Completion of the foundation program.
235. **Intermediate Sculpture. 5 hours.** Abstract sculpture. Investigation of the principles of light, color volume, and scale, done as static constructions in various materials. Prerequisite: Completion of the foundation program.
236. **Colloquium. 1 hour.** Continues PGA 231. Current problems in the plastic and graphic arts presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: PGA 231.
237. **Intermediate Sculpture. 2 hours.** Forming processes. Prerequisite: Any one of PGA 232, 233, 234, 235.
238. **Intermediate Sculpture. 3 hours.** Continues PGA 233. Object oriented; emphasis on forming processes and materials. Includes preparatory drawings and sketches. Prerequisite: PGA 233.
239. **Intermediate Sculpture. 4 hours.** Continues PGA 232. Principles of time and motion sculpture in various means and materials. Prerequisite: PGA 232.



240. **Intermediate Sculpture. 5 hours.** Continues PGA 235. Abstract sculpture, investigating the principles of light, color volume, and scale, done as static constructions in various materials. Prerequisite: PGA 235.
241. **Colloquium. 1 hour.** Continues PGA 236. Current problems in the plastic and graphic arts presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: PGA 236.
242. **Intermediate Sculpture. 2 hours.** Continues PGA 237. Forming processes. Prerequisite: PGA 237.
243. **Intermediate Sculpture. 3 hours.** Continues PGA 238. Object oriented; emphasis on forming processes and materials. Includes preparatory drawings and sketches. Prerequisite: PGA 238.
244. **Intermediate Sculpture. 4 hours.** Continues PGA 239. Principles of time and motion sculpture in various means and materials. Prerequisite: PGA 239.
245. **Intermediate Sculpture. 5 hours.** Continues PGA 240. Abstract sculpture, investigating the principle of light, color volume, and scale, done as static constructions in various materials. Prerequisite: PGA 240.
246. **Colloquium. 1 hour.** Current problems in the plastic and graphic arts presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: PGA 241.
247. **Advanced Sculpture. 2 hours.** Principles of light, form and scale in essentially subtractive methods, executed in various media and means. Prerequisite: Any one of PGA 242, 243, 244, 245.
249. **Advanced Sculpture. 4 hours.** Projects involving figurative and abstract sculpture, emphasizing principles of scale and form relationships in various media through both direct and indirect means. Prerequisite: Any one of PGA 242, 243, 244, 245.
251. **Colloquium. 1 hour.** Continues PGA 246. Current problems in the plastic and graphic arts presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: PGA 246.
252. **Advanced Sculpture. 2 hours.** Continues PGA 247. Principles of light, form, and scale in essentially subtractive methods, executed in various media and means. Prerequisite: Any one of PGA 247, 249, 348, 350.

- 256. Colloquium. 1 hour.** Continues PGA 251. Current problems in the plastic and graphic arts presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: PGA 251.
- 257. Advanced Sculpture. 2 hours.** Continues PGA 252. Principles of light, form, and scale in essentially subtractive methods, executed in various media and means. Prerequisite: Any one of PGA 252, 353, 354, 355.
- 261. Colloquium. 1 hour.** Current problems in the plastic and graphic arts presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: Completion of the foundation program.
- 262. Intermediate Printmaking. 2 hours.** Object and abstract studies relating the principles of drawing and design to the techniques of lithography and serigraphy. Prerequisite: Completion of the foundation program.
- 263. Intermediate Printmaking. 3 hours.** Object and abstract studies relating the principles of drawing and design to the techniques of relief and intaglio. Prerequisite: Completion of the foundation program.
- 264. Intermediate Printmaking. 4 hours.** Based on single and multiple-object imagery. Theory, technique, and practice in the various graphic media, emphasizing experimentation. Prerequisite: Completion of the foundation program.
- 265. Intermediate Printmaking. 5 hours.** Advanced theories of spatial principles, form, and color, developed through the various printmaking media. Prerequisite: Completion of the foundation program.
- 266. Colloquium. 1 hour.** Continues PGA 261. Current problems in the plastic and graphic arts presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: PGA 261.
- 267. Intermediate Printmaking. 2 hours.** Continues PGA 262. Object and abstract studies relating the principles of drawing and design to the techniques of relief and intaglio. Prerequisite: PGA 262.
- 268. Intermediate Printmaking. 3 hours.** Continues PGA 263. Object and abstract studies relating the principles of drawing and design to the techniques of lithography and serigraphy. Prerequisite: Any one of PGA 262, 263, 264, 265.
- 269. Intermediate Printmaking. 4 hours.** Continues PGA 264. Based on single and multiple-object imagery. Theory, technique, and practice in the various graphic media, emphasizing experimentation. Prerequisite: PGA 264.

270. **Intermediate Printmaking. 5 hours.** Continues PGA 265. Advanced theories of spatial principles, form, and color, developed through the various printmaking media. Prerequisite: PGA 265.
271. **Colloquium. 1 hour.** Continues PGA 266. Current problems in the plastic and graphic arts presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: PGA 266.
272. **Intermediate Printmaking. 2 hours.** Continues PGA 267. Object and abstract studies relating the principles of drawing and design to the techniques of relief and intaglio. Prerequisite: PGA 267.
273. **Intermediate Printmaking. 3 hours.** Continues PGA 268. Object and abstract studies relating the principles of drawing and design to the techniques of relief and intaglio. Prerequisite: PGA 268.
274. **Intermediate Printmaking. 4 hours.** Continues PGA 269. Based on single and multiple-object imagery. Theory, technique, and practice in the various graphic media, emphasizing experimentation. Prerequisite: PGA 269.
275. **Intermediate Printmaking. 5 hours.** Continues PGA 270. Advanced theories of spatial principles, form, and color, developed through the various printmaking media. Prerequisite: PGA 270.
276. **Colloquium. 1 hour.** Current problems in the plastic and graphic arts presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: PGA 271.
277. **Advanced Printmaking. 2 hours.** Theory and practice involving the synthesis of object imagery, abstract concepts, and media in printmaking. Prerequisite: Any one of PGA 272, 273, 274, 275.
281. **Colloquium. 1 hour.** Continues PGA 276. Current problems in the plastic and graphic arts presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: PGA 276.
282. **Advanced Printmaking. 2 hours.** Continues PGA 277, but may be taken concurrently with 277. Theory and practice involving the synthesis of object imagery, abstract concepts, and media in printmaking. Prerequisite: PGA 277.
286. **Colloquium. 1 hour.** Continues PGA 281. Current problems in the plastic and graphic arts presented by professionals active in the field. Provides a basis for planning, executing, and evaluating projects in courses in the student's major field. Prerequisite: PGA 281.

- 287. Advanced Printmaking. 2 hours.** Continues PGA 282. Theory and practice involving the synthesis of object imagery, abstract concepts, and media in printmaking. Prerequisite: Any one of PGA 282, 383, 384, 385.
- 318. Synthesis of the Plastic Arts and Design. 3 hours.** Interrelation of the plastic and graphic arts through experiences with two-dimensional and three-dimensional projects. Prerequisite: Any one of PGA 212, 213, 214, 215.
- 319. Advanced Painting. 4 hours.** Scale, form, and proportion appropriate to architectural spaces, using a wide range of materials and techniques. Project models and presentation required. Prerequisite: Any one of PGA 212, 213, 214, 215.
- 320. Advanced Painting. 5 hours.** Projects based on object imagery where scale and form are appropriate to spaces in architectural contexts, involving both traditional and contemporary media. Total presentation, models required; techniques of presentation. Prerequisite: Any one of PGA 212, 213, 214, 215.
- 324. Advanced Painting. 4 hours.** Continues PGA 319. Scale, form, and proportion appropriate to architectural spaces, using a wide range of material and techniques. Project models and presentation required. Prerequisite: Any one of PGA 217, 220, 318, 319, 320.
- 325. Advanced Painting. 5 hours.** Continues PGA 320. Projects based on object imagery where scale and form are appropriate to spaces in architectural contexts, involving both traditional and contemporary media. Total presentation, models required; techniques of presentation. Prerequisite: Any one of PGA 217, 220, 318, 319, 320.
- 329. Advanced Painting. 4 hours.** Continues PGA 324. Scale, form, and proportion appropriate to architectural spaces, using a wide range of materials and techniques. Project models and presentation required. Prerequisite: Any one of PGA 222, 223, 225, 324, 325.
- 330. Advanced Painting. 5 hours.** Continues PGA 325. Projects based on object imagery where scale and form are appropriate to spaces in architectural contexts, involving both traditional and contemporary media. Total presentation, models required; techniques of presentation. Prerequisite: Any one of PGA 222, 223, 225, 324, 325.
- 348. Synthesis on the Plastic Arts and Design. 3 hours.** Interrelation of the plastic and graphic arts through experiences with two-dimensional and three-dimensional projects. Prerequisite: Any one of PGA 242, 243, 244, 245.
- 350. Advanced Sculpture. 5 hours.** Projects, object imagery or abstract sculpture appropriate to architectonic spaces. Prepared drawings and models, un-



limited materials and presentation methods. Prerequisite: Any one of PGA 242, 243, 244, 245.

353. **Advanced Sculpture. 3 hours.** Major developments synthesizing object imagery and abstract concepts with emphasis on scale and spatial relations. Prerequisite: Any one of PGA 247, 249, 348, 350.
354. **Advanced Sculpture. 4 hours.** Continues PGA 249. Projects involving figurative and abstract sculpture, emphasizing principles of scale and form relationships in various media through both direct and indirect means. Prerequisite: Any one of PGA 247, 249, 348, 350.
355. **Advanced Sculpture. 5 hours.** Continues PGA 350. Projects, object imagery or abstract sculpture appropriate to architectonic spaces. Prepared drawings and models, unlimited materials and presentation methods. Prerequisite: Any one of PGA 247, 249, 348, 350.
358. **Advanced Sculpture. 3 hours.** Continues PGA 353. Major developments synthesizing object imagery and abstract concepts with emphasis on scale and spatial relations. Prerequisite: Any one of PGA 252, 353, 354, 355.
359. **Advanced Sculpture. 4 hours.** Continues PGA 354. Projects involving figurative and abstract sculpture, emphasizing principles of scale and form relationships in various media through both direct and indirect means. Prerequisite: Any one of PGA 252, 353, 354, 355.
360. **Advanced Sculpture. 5 hours.** Continues PGA 355. Projects, object imagery or abstract sculpture appropriate to architectonic spaces. Prepared drawings and models, unlimited materials and presentation methods. Prerequisite: Any one of PGA 252, 353, 354, 355.
378. **Synthesis of the Plastic Arts and Design. 3 hours.** Interrelation of the plastic and graphic arts through experiences with two-dimensional and three-dimensional projects. Prerequisite: Any one of PGA 272, 273, 274, 275.
379. **Advanced Printmaking. 4 hours.** Emphasizes the integration of print units into a large-scale context. Prerequisite: Any one of PGA 272, 273, 274, 275.
380. **Advanced Printmaking. 5 hours.** Primarily abstract; emphasizes color and the elements of organization, synthesizes mass printing techniques with the hand process. Prerequisite: Any one of PGA 272, 273, 274, 275.
383. **Advance Printmaking. 3 hours.** Art-print making, synthesizes the various media; emphasis on advanced theories of color and form. Prerequisite: Any one of PGA 277, 378, 379, 380.
384. **Advanced Printmaking. 4 hours.** Continues PGA 379. Emphasizes the



integration of print units into a large-scale context. Prerequisite: Any one of PGA 277, 378, 379, 380.

385. **Advanced Printmaking. 5 hours.** Continues PGA 380. Primarily abstract: emphasizes color and the elements of organization, synthesizes mass printing techniques with the hand process. Prerequisite: Any one of PGA 277, 378, 379, 380.
388. **Advanced Printmaking. 3 hours.** Art-print making, synthesizes the various media; emphasis on advanced theories of color and form. Prerequisite: Any one of PGA 282, 383, 384, 385.
389. **Advanced Printmaking. 4 hours.** Continues PGA 384. Emphasizes the integration of print units into a large-scale context. Prerequisite: Any one of PGA 282, 383, 384, 385.
390. **Advanced Printmaking. 5 hours.** Primarily abstract: emphasizes color and the elements of organization, synthesizes mass printing techniques with the hand process. Prerequisite: Any one of PGA 282, 383, 384, 385.

## POLISH (Pol)

101. **Elementary Polish. 4 hours.** Four additional half hours per week in the language laboratory. For students who have had no work in Polish. **F, W, S**
102. **Elementary Polish. 4 hours.** Four additional half hours per week in the language laboratory. Continues Polish 101. Prerequisite: Pol. 101 or the equivalent. **F, W, S**
103. **Elementary Polish. 4 hours.** Four additional half hours per week in the language laboratory. Continues Polish 102. Prerequisite: Pol. 102 or the equivalent. **F, W**

## POLITICAL SCIENCE (PolS)

Asterisks (\*) indicate general education credit in social sciences.

110. **The Government of Illinois. 4 hours.** The organization and powers of the major branches of the government of Illinois, relations with national and local governments, the legal, political, and administrative problems raised within the structure.

130. **Human Behavior and Politics. 4 hours.** Introduction to the variety of complex ways in which psychology is relevant to the study of politics. Major focus on the human need for power, respect, and security, and capacity for learning and perception; personality differences: authoritarianism, sociability, political style; groups, proximal groups, national character, and political leadership roles. Emphasis on the links between man and his polity. Prerequisite: Sophomore standing.
- \*150. **American Government: Basic Principles. 4 hours.** Historical development and operation of the American constitutional system. Analysis of federalism, civil liberties, and methods of popular control of government. It is strongly recommended that the student take both Political Science 150 and 151 to achieve minimal competence in this area. Prerequisite: Sophomore standing.
- \*151. **American Government: Organization and Powers. 4 hours.** Nature, structure, powers, and procedures of legislative, executive, and judicial departments in the state and in the nation. Basic structure of local government. Prerequisite: PolS. 150 (waived for education majors).
152. **Introduction to Comparative Study of Politics. 4 hours.** Principles of comparative political analysis and of the political systems of several countries outside of the United States.
155. **American Government: Basic Principles. 4 hours.** Honors course for Political Science 150. Prerequisite: University grade-point average of 4.00 or above or James Scholar status and sophomore standing.
156. **American Government: Organization and Powers. 4 hours.** Honors course for Political Science 151. Prerequisite: PolS. 150 or 155 with James Scholar status or a 4.00 University grade-point average.
- \*184. **Introduction to International Relations. 4 hours.** The basic characteristics of the international system, the nature of international relations, major problems and conflicts, the attempts to solve them. Nationalism, diplomacy, and war.
- \*205. **Municipal Government and Administration. 4 hours.** The growth of cities in the United States; legal problems of cities; intergovernmental relations; charters and charter drafting; powers and forms of government organization; politics and pressure-group activity; administrative organization; municipal functions and services; revenue problems. Prerequisite: PolS. 151.
- \*212. **State Government. 4 hours.** Organization and powers of state governments in the United States; constitutions and problems of revision; legislatures and legislation; administrative problems; the state judiciary and judicial reform; intergovernmental relations; financing major services. Prerequisite: PolS. 151.

- \*226. Political Parties. 4 hours.** Historical development, organization, and functioning of state and national parties; committees, conventions, campaigns, and finances; party platforms and issues. Prerequisite: PolS. 151.
- \*234. Comparative Government: Great Britain. 4 hours.** The government of Great Britain compared especially with that of the United States and the U.S.S.R. to illustrate and contrast the politics and governments of democracies and dictatorships.
- \*235. Comparative Government: The Soviet Union. 4 hours.** The nature, evolution, and problems of the political and economic system of the U.S.S.R.
- \*236. Comparative Government: France and Germany. 4 hours.** Evolution of the political systems; analysis of reforms since 1945; operation of the governments and political parties.
- 240. Political System of China. 4 hours.** Examination of Communist China's political system; analysis of techniques of political control, special reference to the roles of ideology and organization; China's foreign policy, emphasis on both the Sino-Soviet conflict and the Sino-American confrontation. Prerequisite: PolS. 151.
- 241. Political Systems of Japan and Korea. 4 hours.** Political systems of contemporary Japan, North Korea, and South Korea. Analysis of their respective political institutions, processes, behaviors, and foreign policies. Prerequisite: PolS. 240 or consent of the instructor.
- 242. Government and Politics of Latin America. 4 hours.** Comparative examination of the governments and politics of selected Latin American countries. Patterns of political leadership and followership, governmental processes, problems of development, and foreign political influence. Prerequisites: PolS. 150 and 151. PolS. 280 is highly recommended.
- 250. Special Problems in Politics. 4 hours.** Independent study with the guidance of a staff member. Arrangements as to content, approach, and credit must be concluded with the staff member concerned. Prerequisites: Junior standing and three courses in social sciences, or consent of the instructor.
- \*251. Symposium on Politics. 1 to 8 hours.** Course content and format is varied to adapt to the changing political scene.
- \*261. Public Administration. 4 hours.** Introduction to the principal concepts, ideas, and issues in public administration; the evolution of administrative thought and practice in the United States; a conceptual scheme for analysis of bureaucratic structure and behavior; the human factor in administration; the politics of the budgetary process; the environmental constraints on bureaucratic organization. The contributions of behavioral science research are stressed. Prerequisite: PolS. 151.

- 280. Introduction to the Study of Emerging Nations. 4 hours.** Comparative study of the political, economic, and social characteristics of underdeveloped nations. Colonialism, nationalism, political ideologies, and problems of effective political organization and functions. Prerequisite: Two courses in political science, economics, sociology, or modern history at the 200-level.
- \*281. United States Foreign Policy. 4 hours.** Credit is not given for Political Science 281 if the student has credit in 285. Analysis of the internal and external factors which influence the formulation and execution of the foreign policy of the United States. Major problems of contemporary foreign policy; constitutional, organizational, administrative, and intellectual factors.
- \*285. Comparative Foreign Policies. 4 hours.** Credit is not given for Political Science 285 if the student has credit in 281. Comparative study of foreign policies of major nations and blocs of nations. Major national interests, substance of foreign policies, and methods of policy formulation.
- \*286. International Organization. 4 hours.** The evolution of international organizations; structure and operation of various types of contemporary international institutions. Special attention to the United Nations, its history, operations, and progress.
- 299. Honors Course. 2 to 4 hours.** May be reelected for three quarters for a maximum of 10 hours. Open only to students majoring in political science. Independent reading and research. Prerequisites: Senior standing, University grade-point average of 4.00, and permission of the department.
- 306. Ghetto Politics. 4 hours.** Individual conferences on assigned papers are required. Analysis of the political impact of the ghetto on local, state, and national political systems; the impotency of the ghetto voter; the ghetto politician; ghetto riots as political protest; the ghetto and presidential politics. Prerequisite: Three courses in political science, American history, or sociology, or consent of the instructor.
- 307. Urban Politics Seminar. 4 hours.** Analysis of the structure and dynamics of political parties and organizations in urban areas. Intensive study of the power structure, strength, and weakness of the Democratic and Republican parties in urban areas, using Chicago and its suburbs as a laboratory. Prerequisites: PolS. 205 and consent of the instructor.
- 311. Government and Politics of Metropolitan Areas. 4 hours.** The problems of governing metropolitan areas; special emphasis on evolving patterns of cooperation among governments in metropolitan areas, such as metropolitan federalism, city-county consolidation, councils of governments, and regional planning commissions. Prerequisite: PolS. 205.
- 315. Legislatures and Legislation. 4 hours.** The legislative function in government; structure and organization of American legislatures, national, state,



and local; party organization in legislatures; legislative procedure; pressure groups and lobbying; relation of the legislature to other branches of government; problems of legislative reorganization. Prerequisite: PolS. 151.

316. **The President and Congress.** 4 hours. Analysis of the relationship of the president and Congress; problems involved in the formulation and execution of public policy. Prerequisite: PolS. 151.
317. **Intergovernmental Relations.** 4 hours. The origin and evolution of the American federal system; federal-state constitutional relationships; intergovernmental fiscal relations; the political cultures; interstate relations; regionalism; state-local relations; interlocal relations and cooperative federalism in functional areas. Prerequisite: PolS. 151 and 205 or 212.
318. **Science, Technology, and Public Policy.** 4 hours. The impact of science and technology on governmental policy in the United States. Responses of the national executive and legislative branches of government; intergovernmental aspects of technological advances.
319. **The Public Administration of Science and Technology.** 4 hours. The response of public systems to the scientific and technological revolution; the governmental institutions being devised to administer science and technology in the public sector. Emphasis on technological problems caused by the emergence of new metropolitan communities.
327. **Public Opinion and Political Communication.** 4 hours. The nature of public opinion and political communication systems; patterns of opinion distribution and techniques for opinion measurement; forces shaping public opinion, with emphasis on the mass media; the impact of public opinion on public policy; comparison of political communication patterns in the United States with less developed and totalitarian nations. Prerequisite: 6 hours of political science, sociology, or modern history.
328. **Propaganda and the Language of Politics.** 4 hours. The nature of propaganda, political symbols, and the language of politics; the uses of political symbols and propaganda in the political processes of democratic and totalitarian societies; international propaganda and psychological warfare; methods and uses of propaganda analysis. Prerequisite: 6 hours of political science, sociology, or modern history.
329. **Organizational Behavior.** 4 hours. The nature and forms of politically relevant organizational behavior in modern society; particular emphasis on political environment of the organizations. Detailed analysis is made of one specific organization in its political-governmental setting. Prerequisite: PolS. 261.
330. **Political Behavior.** 4 hours. An introduction; includes analysis of voting behavior, political leadership, policy formation, and related matters.



337. **The Politics of Alienation.** 4 hours. Conceptual, empirical, and normative analysis of alienation from polity, society, culture, and self. Focus on the political consequences of various forms of alienation, including radicalism, apathy, protest, revolution, renewal, and innovation. Empirical research is required. Prerequisite: PolS. 330.
345. **African Politics South of the Sahara.** 4 hours. Designed to provide the information and analytical tools to interpret current sub-Saharan African politics. Politics in traditional African societies; politics under colonial rule; the struggle for independence; post-independence politics. Prerequisite: Two courses in political science, history, or anthropology.
346. **Political Patterns in West Africa.** 4 hours. Governmental patterns in West Africa, their evolution, and the underlying problems they are designed to meet. One-party African socialism, various forms of multiparty government, and military regimes.
351. **Constitutional Law.** 4 hours. Constitutional provisions and principles as they have developed through Supreme Court interpretation; the amending process; federalism; commerce, taxing, and war powers; due process of law; the constitutional relations between the three major branches of government. Prerequisite: PolS. 151.
353. **Seminar: Problems of Constitutional Law.** 4 hours. Supervised individual study of selected problems arising in the interpretation of the United States Constitution. Prerequisites: PolS. 351 or 355, and consent of the instructor.
355. **The Constitution and Civil Liberties.** 4 hours. The nature and constitutional positions of freedom of religion, speech, press, and others; varying interpretations of these freedoms; difficulties encountered in protecting them; problems of discrimination against racial, religious, and other minorities. Prerequisite: PolS. 151.
356. **Administrative Law.** 4 hours. Legal problems arising in the relationships between the citizen and the government official; administrative rulemaking and enforcement; judicial review of administrative actions. Prerequisite: Consent of the instructor.
362. **Seminar. Public Administration.** 4 hours. Supervised individual study of selected problems. Prerequisite: PolS. 261 or 363.
363. **Comparative and International Administration.** 4 hours. Analysis of bureaucratic structure and behavior in selected countries; examination of the problems and practices of the international civil service. Consideration of a conceptual framework for comparative administrative analysis. Prerequisite: PolS. 261 or 286 or one course in comparative government.

- 375. Political Development of the Middle East. 4 hours.** Analysis of the contemporary politics of the countries of the Middle East, including the clash of traditional institutions and new social and political forces, such as Islam, nationalism, the military, political parties, and ideological trends. Prerequisite: Six hours of political science or modern history at the 200 level or higher. PolS. 380 is recommended.
- 376. International Relations of the Middle East. 4 hours.** Regional problems, such as the drive for Arab unity, the Arab-Israeli dispute, the role of the region in world politics, and the decline of Western influence in the area. Prerequisite: PolS. 284 or a course in modern diplomatic history at the 200 level or higher.
- 381. Politics of Emerging Areas. 4 hours.** Analysis of selected governments and blocs of governments in Asia, Africa, and Latin America which represent different types of problems and different stages of the development process. Relations between underdeveloped and developed areas. Prerequisite: PolS. 380 or one course in non-Western politics.
- 387. International Law. 4 hours.** The theory and practice of international law; particular reference to its evolving role in the contemporary world. Decisions of international tribunals, past and present, are analyzed and the contributions of the United Nations to the progressive development of international law are examined. Prerequisites: PolS. 151 and one course in international relations or organization.
- 388. Seminar: Problems of American Foreign Relations. 4 hours.** Supervised individual study of selected problems of contemporary United States foreign relations. Prerequisite: PolS. 281 or 284 or consent of the instructor.
- 390. Scope and Methods of Political Science. 4 hours.** An examination of the scope and subject matter of political science. Special attention is given to the analytic processes in the development of concepts, hypotheses, and theories. Methodologies and modes of analysis now in use by political scientists. Prerequisites: PolS. 151 and one 200-level course in political science.
- 391. Political Power. 4 hours.** Examines the nature of political power. The student is introduced to some of the major literature of power, and the development of the concept of political power as a descriptive category adequate to the comparative analysis of broader political phenomena, such as parties, official decision-making structures and movements. Prerequisites: PolS. 151 and four hours of upper-division political science courses or consent of the instructor.
- 392. Democratic Theory. 4 hours.** Democracy as a procedure of government and the value commitments associated with this form of government. Attention is given to corporate wealth, special interests, bureaucracy, and the mass media as they affect the existence of democratic government.

393. **History of Political Theory. 4 hours.** A survey of the evolution of Western political thought from the Greeks through the sixteenth century. An analysis of selections from the writings of outstanding thinkers of the period; an examination of some contemporary theorists who continue to develop the political theories of these early thinkers. Prerequisite: Junior standing.
394. **History of Political Theory. 4 hours.** Continues Political Science 393. The development of political theory from the seventeenth century to the contemporary period. The influence of Hobbes, Locke, and Rousseau on the development of liberalism and the modern welfare state. Analysis of the crisis of modern democracy against the challenges of Marxism and totalitarianism. Examination of some contemporary theorists whose work parallels that of Hobbes, Locke, Rousseau, Burke, Marx, and J. S. Mill. Prerequisite: PolS. 393.
397. **American Political Thought. 4 hours.** Political thought of the colonial, revolutionary, constitution-making, and Civil War periods; consideration of recent criticisms and defense of popular government as applied in the United States.
399. **Seminar in Political Theory. 4 hours.** Supervised individual study and research on selected problems or works in political theory. Prerequisite: PolS. 393 or consent of the instructor.

## PORTUGUESE (Port)

101. **Elementary Portuguese. 4 hours.** Two additional half hours per week in the language laboratory. For students without credit in Portuguese. Oral practice, reading and grammar.
102. **Elementary Portuguese. 4 hours.** Two additional half hours per week in the language laboratory. Continues Port. 101. Prerequisite: Port. 101 or the equivalent.
103. **Elementary Portuguese. 4 hours.** Two additional half hours per week in the language laboratory. Continues Port. 102. Prerequisite: Port. 102 or the equivalent.
104. **Intermediate Portuguese. 4 hours.** Two additional half hours per week in the language laboratory. Rapid reading, grammar review, composition, conversation. Prerequisite: Port. 103 or two years of high school Portuguese.
105. **Intermediate Portuguese. 4 hours.** Two additional half hours in the language laboratory. Continues Portuguese 104. Prerequisite: Port. 104 or the equivalent.

106. **Intermediate Portuguese. 4 hours.** Two additional half hours in the language laboratory. Continues Portuguese 105. Prerequisite: Port. 105 or the equivalent.

## PSYCHOLOGY (Psch)

Asterisks (\*) indicate general education credit in social sciences.

- \*100. **Introduction to Psychology. 4 hours.** Credit is not given for Psychology 100 if the student has credit in 102. Introduction to the study of behavior; methods, principles, and applications to the understanding of human actions. Lectures, demonstrations, and laboratory investigations. **F, W, S, Su**
- \*102. **Introduction to Psychology. Honors Course. 5 hours.** Credit is not given for Psychology 102 if the student has credit in 100. Systematic introduction to psychology as a behavioral science; methods of psychological investigation, research findings, theoretical interpretations. Lectures, demonstrations, discussion sections, and laboratory experiments. Prerequisite: Honors status or consent of the instructor. **F**
- \*110. **Psychology of Adjustment. 4 hours.** Basic principles of behavior in relation to the development, modification, and assessment of adjustive processes. Prerequisite: Psch. 100 or 102. **F, W, S, Su**
- \*115. **Social Psychology. 4 hours.** Credit is not given for Psychology 115 if the student has credit in Sociology 130. The principles of behavior applied to the individual in the social situation. Prerequisite: Psch. 100 or 102. **F, W, S, Su**
- \*130. **Psychology in Business and Industry. 4 hours.** Application of the methods and findings of psychology to the study of people at work. Emphasis on problems of personnel selection, training, work methods, safety, motivation, labor-management relations, counseling, and related topics. Prerequisite: Psch. 100 or 102 or consent of the instructor. **F, W, S, Su**
- \*210. **Psychology of Personality. 4 hours.** Systematic study of the development, dynamics, and structure of personality; methodology, theory, and empirical research. Prerequisite: 8 hours of psychology. **W**
- \*215. **Psychology of Attitude and Opinion. 5 hours.** Same as Speech and Theatre 215. Survey of behavioral approaches to the measurement of social attitudes and opinions; determinants and correlates of public attitudes and opinions. Lecture and participation in field and laboratory studies. Individual projects and readings are assigned. Prerequisite: 8 hours of psychology or consent of the instructor. **F, W, S**



- \*220. Psychology of Childhood and Adolescence. 4 hours.** Development of behavior in infancy, childhood, and youth. Emphasis on learning, motivational, and biosocial factors. Prerequisite: 8 hours of psychology or consent of the instructor. **F, W, S**
- \*221. Child Growth and Development. 4 hours.** Growth and development in infancy, childhood, and adolescence; emphasis on genetic, constitutional, and organic determinants in relation to environmental factors, particularly in early stages. Prerequisite: 8 hours of psychology or consent of the instructor. **F**
- \*222. Psychology of Adulthood and Old Age. 4 hours.** Determinants of adjustment in marriage, educational and vocational pursuits, retirement, and old age; emphasis on learning, motivational, and biosocial factors. Prerequisite: 8 hours of psychology or consent of the instructor. **W**
- \*224. Educational Psychology. 4 hours.** Basic undergraduate course in the psychology of education. Facts and principles of physical growth and development, learning, concept formulation, acquired motivation, and achievement testing applied to the classroom situation. Prerequisite: Psch. 100 or 102. **F, Su**
- \*230. Occupational and Vocational Psychology. 4 hours.** Relations of individual aptitudes, interests, and personality characteristics to occupational choice and success. Prerequisite: 8 hours of psychology or consent of the instructor. **W**
- \*240. Introduction to Psychological Testing. 4 hours.** Not open to students electing Psychology 243. Introduction to the principles of psychological rating, testing, and polling, with a survey of representative techniques. Emphasis on the basic concepts of objectivity, reliability, and validity. Lectures, laboratory, and conference sections. Prerequisite: 8 hours of psychology. **F, W, S, Su**
- \*241. Research Methods in Psychology. 3 hours.** Techniques and problems associated with the study of behavior. Emphasis on methodology in human and animal research, preparatory to the understanding of laboratory and naturalistic investigations. Prerequisite: Psch. 100 or 102. **F, W, S, Su**
- \*243. Statistical Methods in Behavioral Science. 5 hours.** Credit is not given for Psychology 243 if the student has credit in Quantitative Methods 171 or Sociology 185 or Geography 185. Introduction to the use of statistics in behavioral research: descriptive statistics, statistical inference, elementary correlational methods. Lectures and laboratory. Prerequisites: 8 hours of psychology or sociology, and consent of the instructor. **F, W, S, Su**
- \*247. Differential Psychology. 4 hours.** The nature, determinants, and correlates of individual and group differences in behavior. Prerequisite: Psch. 240 or 243 or consent of the instructor. **S**



- \*250. Introduction to Experimental Psychology I. 5 hours.** Critical survey of experimental findings, special methods, and laboratory practicum in basic areas of psychology: psychophysical methods, sensory processes, perception. Prerequisites: Psch. 241 and 243 or the equivalents, and consent of the instructor. **S**
- \*251. Introduction to Experimental Psychology II. 5 hours.** Critical survey of experimental findings, special methods, and laboratory practicum in basic areas of psychology: simple learning and conditioning, primary and acquired drives. Prerequisites: Psch. 241 and 243 or the equivalents, and consent of the instructor. **F, W, Su**
- \*252. Experimental Psychology III. 5 hours.** Critical survey of experimental findings, special methods, and laboratory practicum in basic areas of psychology: verbal learning, transfer of training, retention, problem solving, and concept formation. Prerequisites: Psch. 241 and 243 or the equivalents, and consent of the instructor. **S**
- \*256. Introduction to Physiological Psychology. 5 hours.** Critical survey of experimental findings, methods of research, and laboratory practicum in the physiological correlates of behavior. Prerequisites: Psch. 241 and 243 or the equivalents and consent of the instructor. **F, W**
- \*291. Special Topics (Honors). 2 hours.** May be repeated for a total of 6 hours. Required for departmental distinction. Reading, discussion, and written reviews of current technical literature. Prerequisites: Any two of Psch. 250, 251, 252, 256, or 318 and consent of the instructor. **W, S**
- \*299. Readings and Research. 2 to 6 hours.** May be repeated for a maximum of 18 hours. Individual research investigation of a special problem under direction of a staff member. Prerequisites: Any two of Psch. 250, 251, 252, 256, or 318 and consent of the instructor. **F, W, S, Su**
- 310. Advanced Social Psychology. 4 hours.** Same as Sociology 315. Critical analysis of empirical research on social perception, communication and influence, group structure, role analysis, and socialization processes. Prerequisites: Psch. 243 or Soc. 185, and 16 hours in psychology or sociology.
- 315. Psychology of Social Influence. 4 hours.** Methodology, results, and interpretations of studies of the influence of social variables on attitude development and modification, acculturation, perception, and judgment. Prerequisites: Graduate standing or consent of the instructor. **S**
- 316. Animal Behavior. 4 hours.** Principles and methods in the study of animal behavior; review of the social behavior of representative species in various phyla. Prerequisites: BioS. 101, 102 and Psch. 241, or consent of the instructor.

317. **Social Development.** 4 hours. Theories and research on the effects of social evaluation, imitation and observational learning, and other social factors on the development of cognition, language, and attitudes in children and adolescents. Emphasis on the consequences of impoverished or atypical social environments. Prerequisites: Psych. 220 or the equivalent, and consent of the instructor. **W**
318. **Experimental Social Psychology.** 4 hours. Critical survey of experimental studies of independence, power, influence, social learning and perception, and other aspects of social behavior, with laboratory practicum and demonstrations. Prerequisites: Psych. 115, 241, and 243 or the equivalents, and consent of the instructor. **F**
323. **Psychology of the Exceptional Child.** 4 hours. Methods, results, and interpretation of studies of physically, intellectually, and emotionally deviant children, with special reference to their implications for education and behavior modification. Prerequisite: 12 hours of psychology including Psych. 220 or the equivalent, or consent of the instructor. **F, S**
330. **Organizational Psychology.** 4 hours. Same as Management 330. Individual psychological and group processes and their interaction with organizational structure. Behavioral factors in effective organizational change. Prerequisites: Psych. 130 and one course in social psychology, or the equivalents.
332. **Personnel Psychology.** 4 hours. Systematic study of the development and utilization of psychological techniques of personnel selection, classification, and assessment. Prerequisites: 12 hours of psychology including Psych. 230; Psych. 240 or 243 or the equivalent, or consent of the instructor. **S**
333. **Motivation and Morale in Industry.** 4 hours. Same as Management 333. Concepts and methods in the assessment and modification of employee motivation, attitudes, and morale. Prerequisite: 12 hours of psychology including Psych. 332, or the equivalent.
335. **Psychology of Industrial Training.** 4 hours. Same as Management 335. Psychological measurement techniques in assessing training needs and evaluating training effectiveness. Application of psychological techniques to the development of industrial training programs. Prerequisite: Psych. 332 or the equivalent.
338. **Psychology of Industrial Conflict.** 4 hours. Same as management 338. Behavioral analysis of the causes, dimensions, and modes of resolution of industrial conflict; special emphasis on labor-management relations. Prerequisite: Psych. 330 or the equivalent.
343. **Advanced Statistics.** 4 hours. Elementary probability theory, empirical and theoretical distributions, points and interval estimation, hypothesis testing. Prerequisite: 12 hours of psychology including Psych. 243 or the equivalent, or consent of the instructor.

345. **Psychometric Applications.** 4 hours. Theory of psychological tests and measurement applied to problems of ability and personality testing; opinion sampling; reliability and validity; prediction and selection processes. Prerequisite: 12 hours of psychology including Psch. 243 or the equivalent, or consent of the instructor. **S**
350. **Learning and Conditioning.** 4 hours. Methods, results, and interpretation of experimental studies of basic learning processes in animal and human subjects. Prerequisites: Psch. 250 and 251 or the equivalents and consent of the instructor. **F**
351. **Programmed Learning.** 4 hours. Theory and research in the techniques, applications, and results of programmed instruction. Prerequisite: 12 hours of psychology including Psch. 224 or the equivalent, or consent of the instructor. **W**
352. **Motivation.** 4 hours. Methods, results, and interpretation of experimental studies of basic motivational processes in animal and human subjects. Prerequisites: Psch. 250 and 251 or the equivalents and consent of the instructor. **W**
354. **Verbal Behavior and Higher Processes.** 4 hours. Methods, results, and interpretations of experimental studies of verbal learning, transfer and retention. Prerequisite: Psch. 252 or consent of the instructor. **S**
355. **Higher Processes.** 4 hours. Methods, results, and interpretations of experimental studies of language behavior, problem solving, concept formation, and creativity. Prerequisites: 12 hours of psychology and consent of the instructor. **W**
356. **Sensory Processes and Perception.** 4 hours. Methods, results, and interpretation of experimental studies of sensory and perceptual processes. Emphasis on vision and audition. Prerequisites: Psch. 250 and 251 or the equivalents, or consent of the instructor. **S**
360. **Human Factors.** 4 hours. Application of experimentally derived principles of behavior to the design of equipment for efficient use and operation. Sensory and perceptual processes, motor skills, and experimental methodology. Prerequisite: 12 hours of psychology including Psch. 250 and 251 or the equivalents, or consent of the instructor. **S**
361. **Instrumentation in Psychology.** 4 hours. Use of transducers, programming equipment, and recording systems in psychological research. Prerequisite: Graduate standing or consent of the instructor. **Su**
362. **Physiological Psychology.** 4 hours. Methods, results, and interpretation of experimental studies of physiological and neurochemical correlates of

learning, motivation, and perception. Laboratory demonstrations and problems. Prerequisite: Consent of the instructor. **S**

- 370. Systems and Theories. 4 hours.** Critical introductory analysis of major historical systems and their representation in current theoretical issues. Prerequisites: Psch. 250 and 251 or the equivalents and consent of the instructor.
- 380. Abnormal Psychology. 4 hours.** Forms and determinants of behavior and personality disorders. Prerequisites: 12 hours of psychology and consent of the instructor.
- 382. Introduction to Psychological Assessment. 4 hours.** Systematic analysis of the nature of psychological tests and their application; introduction to intelligence, achievement, personality, and interest tests. Practice in administration and interpretation. Prerequisites: 12 hours of psychology including Psch. 243 or the equivalent and consent of the instructor. **F**
- 399. Problems in Psychology. 2 to 12 hours.** May be repeated. Individual research investigation of special problems under the direction of a staff member. Prerequisites: Consent of the instructor and approval by the head of the department. **F, W, S, Su**

## QUANTITATIVE METHODS (QM)

- 270. Statistics I. 3 hours.** The role of statistics in the scientific approach to decisionmaking. Data sources, accuracy, precision. The concepts of average and dispersion as applied to samples and universes. Emphasis on modern aids to problem solving. Prerequisites: Math. 110, 111, and 112.
- 271. Statistics II. 3 hours.** The nature and contributions of probability theory to the study of decisionmaking under uncertainty. Probability distributions; sampling distributions. Concepts and measurement of precision for pertinent statistics. Nonparametric statistics and their use in decisionmaking. Prerequisite: QM 270.
- 272. Statistics III. 3 hours.** Two and higher dimensional considerations, regression analysis, time series, models, precision, strategy. Prerequisite: QM 271.
- 370. Multivariate Analysis. 4 hours.** Theory and application of sampling from multivariate normal populations. Topics include such multivariate methods as multilinear regression, canonical correlation; analysis of variance and covariance; discriminant functions, structure of multivariate observations, both principal components and factor analysis. Prerequisites: QM 172, Math. 195, 348, or consent of the instructor.



- 371. Survey Research. 4 hours.** Applications of sampling theory and methods of planning, conducting, and evaluating surveys for measuring public opinion, consumer attitudes and preferences. Instruments of measurement, sampling design, estimation, sources of errors and bias. Case studies with application to actual situations. Prerequisite: QM 172 or the equivalent.
- 375. Information Systems. 4 hours.** An introduction to the theory and concepts of systems including: classification, deterministic and probabilistic models, Markov processes and Monte Carlo techniques, simulation. The model as related to the computer, types of programming, experimentation and evaluation. Prerequisite: QM 172 or consent of the instructor. Math. 194 or 195 is recommended.
- 376. Survey of Operations Research. 4 hours.** Methods, techniques, and applications; linear programming, simulation, production and inventory theory, queuing theory, game theory. Prerequisites: Math. 112 and QM 172.
- 378. Dynamic Programming. 4 hours.** Theory and application to solving problems in multi-stage decision processes arising in a wide variety of fields: operations research, engineering and mathematics. Deterministic and random processes are considered, and computational and analytical methods of solution derived. Prerequisites: Math. 220 or the equivalent, QM 375 and 376.

## **RHETORIC (Rhet)**

- 101. Freshman Rhetoric and Composition. 4 hours.** Elementary training and practice in the comprehension and expression of written English. W, S, Su, F
- 102. Freshman Rhetoric and Composition. 4 hours.** Elementary training and practice in the comprehension and expression of written English. Prerequisite: Rhet. 101. W, S, Su, F
- 111. Freshman Rhetoric and Composition, Honors Course. 4 hours.** A first-quarter course in rhetoric for students in the freshman core program. Prerequisite: Admission to the core program.
- 112. Freshman Rhetoric and Composition, Honors Course. 4 hours.** A second-quarter course in rhetoric for students in the freshman core program. Prerequisites: Admission to the core program and Rhet. 111. W
- 133. Principles of Composition. 4 hours.** Practice in exposition; emphasis on organization, paragraphing, and sentence structure. Prerequisite: Grade of A or B in Rhet. 102 or consent of the instructor. W, S, Su, F
- 144. Narrative Writing. 4 hours.** Provides practice in the writing of description,



narrative sketches, stories. Prerequisite: Grade of A or B in Rhet. 102 or consent of the instructor. **W, S, Su, F**

- 180. Introduction to Rhetoric. 0 hours.** Restricted to students participating in Educational Assistance Program. Fundamental skills involved in expressive and expository writing and general communication effectiveness.
- 251. Business Communication. 4 hours.** Study and practice in written informative and/or persuasive communications in business and industry. Prerequisites: Rhet. 101 and 102. **W, S, Su, F**

## **RHETORIC FOR FOREIGN STUDENTS (RhetF)**

- 103. English as a Foreign Language. No credit.** Intensive review of basic English structure for foreign students inadequately prepared for Rhetoric 101. Prerequisites: Reading knowledge of English and ability to understand instructions, and consent of the instructor.
- 104. English as a Foreign Language. No credit.** Continues RhetF. 103. For students who may be inadequately prepared for Rhetoric 101. A rapid, intensive review of basic English structure; study of more complicated sentence patterns; practice in oral and written composition. Prerequisite: RhetF. 103 or consent of the instructor.
- 105. English as a Foreign Language. No credit.** May be taken concurrently with Rhetoric 101. Intensive remedial writing for the foreign student in the area of his special difficulties. Prerequisite: RhetF. 104 or consent of the instructor. **W, S**

## **RUSSIAN (Russ)**

Asterisks (\*) indicate general education credit in humanities.

- 101. Elementary Russian. 4 hours.** Four additional half hours per week in the language laboratory. For students who have had no work in Russian. **F, W, S, Su**
- 102. Elementary Russian. 4 hours.** Four additional half hours per week in the language laboratory. Continues Russian 101. Prerequisite: Russ. 101 or the equivalent. **F, W, S**
- 103. Elementary Russian. 4 hours.** Four additional half hours per week in the language laboratory. Continues Russian 102. Prerequisite: Russ. 102 or the equivalent. **F, W, S**

104. **Intermediate Russian. 4 hours.** Four additional half hours per week in the language laboratory. Reading, oral-aural practice, systematic functional grammar. Prerequisite: Russ. 103 or the equivalent. **F, W, S, Su**
105. **Intermediate Russian. 4 hours.** Four additional half hours per week in the language laboratory. Continues Russian 104. Prerequisite: Russ. 104 or the equivalent. **F, W, S**
106. **Intermediate Russian. 4 hours.** Four additional half hours per week in the language laboratory. Continues Russian 105. Prerequisite: Russ. 105 or the equivalent. **F, W, S**
201. **Speaking and Writing Russian I. 4 hours.** Conversation and composition, systematic grammar, vocabulary development, aural comprehension, pronunciation drill, simple applied phonetics. Prerequisite: Russ. 106 or the equivalent. **F**
202. **Speaking and Writing Russian II. 4 hours.** Continues Russian 201. Prerequisite: Russ. 201 or the equivalent. **W**
203. **Speaking and Writing Russian III. 4 hours.** Continues Russian 202. Prerequisite: Russ. 202. **S**
204. **Corrective Russian Phonetics. 1 hour.** May be repeated once for credit. Pronunciation and intonation practice. Prerequisite: Russ. 106 or the equivalent.
205. **Speaking and Writing Russian IV. 4 hours.** Continues Russian 203. Prerequisite: Russ. 203 or the equivalent.
206. **Speaking and Writing Russian V. 4 hours.** Continues Russian 205. Prerequisite: Russ. 205 or the equivalent.
215. **Main Currents of Russian Thought I. 4 hours.** Literary, philosophical, and theological works, from the beginning to 1725; structured to acquaint the student with the main cultural forces that shaped Russian thought and manner. Given in English. Prerequisite: Junior standing or consent of the instructor. **W**
216. **Main Currents of Russian Thought II. 4 hours.** Continues Russian 215. Covering the period from 1725 to the October Revolution of 1917. Given in English. Prerequisite: Junior standing or consent of the instructor.
- \*221. **Introduction to Modern Russian Literature I. 4 hours.** Early nineteenth century literature; special attention to the major works of Pushkin, Gogol, and Lermontov. Readings and lectures in English; selected readings in the original for Russian language students. Prerequisite: Junior standing or consent of the instructor. **F**

- \*222. Introduction to Modern Russian Literature II. 4 hours.** Late nineteenth century literature; special attention to selected works by Turgenev, Tolstoy, Dostoevsky. Readings and lectures in English; selected readings in the original for Russian language students. Prerequisite: Junior standing or consent of the instructor. **W**
- \*223. Introduction to Modern Russian Literature III. 4 hours.** Early twentieth century literature; special attention to works by Chekhov, Bunin, Gorky, Sholokhov, Pasternak, and others. Readings and lectures in English; selected readings in the original for Russian language students. Prerequisite: Junior standing or consent of the instructor. **S**
- \*224. Introduction to Literary Analysis. 4 hours.** Selected masterpieces of Russian literature analyzed from the structural, thematic, historical, psychological, sociological, biographical, and linguistic point of view. Prerequisite: Any one of the Russ. 221, 222, 223 sequence. **W, S**
- 230. Studies in the Russian Short Story. 4 hours.** The Russian short story as a literary form. Close readings of selected short stories of the nineteenth century masters. Prerequisite: Junior standing or consent of the instructor. **S, Su**
- 260. Russian for the Scientist. 4 hours.** May not be taken to fulfill foreign language graduation requirements. An accelerated course in the structure of Russian. Morphology, basic syntax, reading texts, and the mechanics of translating from Russian. For those seeking reading ability in scientific or technical material in the humanities and the social and natural sciences. Prerequisite: Junior standing. **W**
- 292. The Structure of Serbo-Croatian. 4 hours.** Serbo-Croatian phonology, morphology, and syntax presented as a background and basis for comparison of the East Slavic and South Slavic branches of the Slavic Languages. **Su**
- \*299. Independent Study. 1 to 6 hours.** May be repeated for credit. Prerequisites: Russ. 106 or the equivalent and approval of the department.
- 320. Russian Poetry I. 4 hours.** Major poets from 1700 to 1840: Kantemir, Trediakovskij, Lomonosov, Derzavin, Fonvizin, Krylov, Pushkin, and others. Readings in Russian, discussion in English. Prerequisite: 24 hours of Russian, including two quarters of the 221, 222, 223 sequence, or consent of the instructor. **F**
- 321. Russian Poetry II. 4 hours.** Major poets from 1840 to the 1890's: Zukovskij, Batjuskov, Gnedic, Katenin, Odoevskij, Lermontov, Nekrasov, Plesceev, Tjutcev, Fet, and others. Readings in Russian, discussion in English. Prerequisite: 24 hours of Russian, including two quarters of the 221, 222, 223 sequence, or consent of the instructor. **W**

- 322. Russian Poetry III. 4 hours.** Major poets from the 1890's to the present: Merezhkovskij, Bal'mont, Sologub, Belyj, Blok, Axmatova, Mandel'stam, Esenin, Majakovskij, Pasternak, Tixonov, Simonov, Evtusenko, Voznesenskij, Rozdestvenskij, and others. Readings in Russian, discussion in English. Prerequisite: 24 hours of Russian, including two quarters of the 221, 222, 223 sequence, or consent of the instructor. **S**
- 331. The Teaching of Russian in the Secondary School. 3 hours.** Modern techniques in the teaching of Russian, including the language laboratory. Prerequisites: Russ. 203 and one course in Russian literature.
- 350. Russian Novel I. 4 hours.** Historical and critical study of the development of the Russian novel from 1800 to about 1860: Pushkin, Lermontov, Gogol, Goncharov, Aksakov, Chernishevsky. Prerequisite: Junior standing or consent of the instructor. **F**
- 351. Russian Novel II. 4 hours.** Continues Russian 350. The development of the Russian novel from 1860 to about 1900: Turgenev, Alexey Tolstoy, Saltykov-Shchedrin, Lev Tolstoy, Dostoevsky, Leskov. Prerequisite: Junior standing or consent of the instructor. **W**
- 360. Survey of Russian Drama. 4 hours.** Major authors from the beginning of the Enlightenment to the end of the nineteenth century: Sumarokov, Fonvizin, Ozerov, Griboyedov, Pushkin, Gogol, Turgenev, Ostrovsky, A. Tolstoy, L. Tolstoy, Chekhov, Gorky. Prerequisite: Russ. 224 or Spch. 122 or consent of the instructor. **F**

## SOCIOLOGY (Soc)

Asterisks (\*) indicate general education credit in social sciences.

- \*100. Introduction to Sociology. 4 hours.** Analysis and description of the structure and dynamics of human society. The application of scientific methods to the observation and analysis of social norms, groups, intergroup relations, social change, social stratification, and institutions.
- \*130. Society and Individual Development. 4 hours.** Credit is not given for Sociology 130 if the student has credit in Psychology 115. Social Psychology: role theory, influence of language in personality development and social behavior. Prerequisite: Soc. 100.
- \*131. Social Problems. 4 hours.** Sociological aspects of some of the more important modern social problems; social interrelationships and culture conflicts involved in their genesis, significance, and amelioration or prevention. Prerequisite: Soc. 100.

185. **Introduction to Social Science Research Methods.** 4 hours. Same as Geography 185. The application of statistical methods in social science. Topics include research design and the role of statistics in sociological investigation, measures of central tendency and dispersion, simple correlation techniques, contingency analysis, interpretation of survey findings, and introduction to statistical inference. One hour per week of laboratory work in data and analysis. Prerequisite: Soc. 100.
- \*197. **General Education Colloquium in Sociology.** 4 hours. May be repeated for credit with consent of the instructor. Special topics designed to serve for purposes of general education. Prerequisite: Soc. 100.
- \*215. **Collective Behavior.** 4 hours. Crowds and diffuse collectivities; collective processes such as panics, crazes, and hostile mobs; the relationship between societal conditions and occurrence of these processes; the relationship of collective behavior to social change. Prerequisite: Soc. 100.
- \*216. **Social Movements.** 4 hours. Origins of social conflict and alienation; development and articulation of ideologies and mass organizations; consequences of success and failure of social movements and, with special emphasis, political movements. Prerequisite: Soc. 100.
- \*225. **Racial and Cultural Minorities.** 4 hours. Sociological and social-psychological analysis of racial, religious, or other ethnic groups; consideration of some of the historical and current social problems resulting from their relationships in society. Prerequisite: Soc. 100.
- \*231. **Criminology.** 4 hours. Same as Criminal Justice 231. The nature and extent of crime in American society; assessment and evaluation of the various factors and influences that lead to criminal behavior; various measures proposed for the control of criminal behavior. Prerequisite: 8 hours of sociology.
- \*232. **Juvenile Delinquency.** 4 hours. Same as Criminal Justice 232. Various conceptions of the nature of juvenile delinquency and its causes; the juvenile-court movement; juvenile detention, treatment of juvenile offenders; delinquency control programs. Prerequisite: Soc. 231 or CrJ. 231.
246. **The Sociology of Religion.** 4 hours. Analysis of the structures and functions of religious institutions, particularly as found in modern society. Special attention to the interplay between religion and other social phenomena such as economics and politics; the social-psychological aspects of religious behavior; current trends in religious institutions. Prerequisite: Soc. 100.
262. **Sociological Analysis I.** 4 hours. Fundamental procedures of social research and their application to sociological problems. Critical analysis of current research in sociology. Laboratory practice in research procedures. Prerequisite: Soc. 185.



263. **Sociological Analysis II. 4 hours.** Continues Sociology 262. Analysis and interpretation of sociological data. Introduction to multi-variate analysis, scale construction, sociometric analysis. Critical analysis of special problems in sociology. Laboratory practice in research procedures. Prerequisite: Soc. 262.
- \*271. **Population and Human Ecology. 4 hours.** A general introduction to population characteristics and trends in population dynamics—fertility, mortality, and migration. Prerequisite: Soc. 100 or the equivalent.
- \*276. **The Sociology of Urban Life in Industrial Society. 4 hours.** Life conditions in the modern city as they are affected by the institutions in a rapidly changing industrial society. Prerequisite: Soc. 100.
287. **Senior Seminar I. 2 hours.** No credit is given in Sociology 287 until completion of 288. Students will report to the seminar on current research and developments among sociologists and will submit to questions, criticism, and evaluation of their reports. Prerequisite: Sociology major, senior standing, and all-University 4.00 average.
288. **Senior Seminar II. 2 hours.** Continues Sociology 287. Students will report to the seminar on current research and developments among sociologists and will submit to questions, criticism, and evaluation of their reports. Prerequisite: Soc. 287.
- \*297. **General Education Colloquium in Sociology. 4 hours.** May be repeated for credit with consent of the instructor. Special topics designed to serve for purposes of general education for upper-classmen. Prerequisite: Junior standing and Soc. 100.
299. **Honors Course. 2 to 6 hours.** May be repeated with the permission of the department. Individual study of research projects. Prerequisites: Major in sociology, senior standing, all-University 4.00 average and approval of the department.
303. **Sociological Statistics. 4 hours.** Introduction to statistical tests of sociological hypotheses; estimation procedures; selected statistical procedures commonly used in sociology. Prerequisite: Soc. 263 or consent of the instructor.
315. **Advanced Social Psychology. 4 hours.** Same as Psychology 310. Critical analysis of empirical research on social perception, communication and influence, group structure, role analysis, and socialization processes. Individual projects are required. Prerequisites: Soc. 185 or Psch. 243 and 16 hours in sociology or psychology.
316. **Adult Socialization. 4 hours.** Socialization as a process of induction into new roles which occurs throughout the life cycle; the process is analyzed

both at a social-psychological and a social-systems level with illustrations from various settings, such as marriage and family, illness, migration, and particularly socialization into occupations and professions. Prerequisite: 8 hours of sociology at the 200 or 300 level.

- 317. Social Psychology of Theatre. 4 hours.** Same as Speech and Theatre 317. Compares social-psychological theories which are explicitly dramaturgical and theories of drama which are explicitly social. Considers dramatic works as social-psychological events. Prerequisite: Soc. 130 or Psych. 115 or consent of the instructor.
- 320. Sociology of Mass Communications. 4 hours.** Sociological analysis of the mass media of communication; empirical studies of the impact of the media on American society and culture; impact of television on children; effects of the media upon attitudes and opinions; processes by which news is created and transmitted. Prerequisite: 4 hours of upper-division sociology or Soc. 100 and Spch. 113.
- 325. Age Groups and the Social Order. 4 hours.** The relations of age groups to social structure; the demographic, sociological, and social-psychological conditions affecting the salience of age as a basis of social organization; recent writings on adolescents and youth; the theory of subcultures as applied to youth groups; relations between generations; current directions in the study of youth groups, both conventional and deviant. Prerequisite: 4 hours of upper-division sociology.
- 341. Social Stratification and Classes. 4 hours.** Nature and systems of differentiation and ranking in societies, emphasis on the class structure in the United States; life chances, prestige, status, power, and social mobility in the United States and other societies. Prerequisite: Soc. 263 or consent of the instructor.
- 343. Sociology of Education. 4 hours.** The relationship of the educational system to the social structure, major emphasis on the role of education in an advanced technological society. Prerequisite: 8 hours of sociology.
- 344. Industrial Sociology. 4 hours.** Analysis of industrial society and industrial institutions; the meaning of work and work relations and of the relationship between work and authority, with cross-cultural emphasis; sociological analysis of collective bargaining and of the impact of industrial and labor organizations on the community and on society. Prerequisite: 8 hours of sociology.
- 345. The Sociology of the Family. 4 hours.** The family as a social institution; its origin, its nature of kinship, its development, and its prospects. Prerequisite: 8 hours of sociology.
- 346. Sociology of Science. 4 hours.** Organizations of the scientific enterprise; emergence of science as a social institution; interrelations with other institu-

tions such as government, religion, economy, and the arts. Science as a social phenomenon; regularities in scientific behavior; consideration of both historical and contemporary material. Prerequisite: 8 hours of sociology.

347. **Sociology of Complex Organizations. 4 hours.** Characteristics of business, government agencies, schools, hospitals, and other large-scale organizations; approaches used to study organizations; theoretical and empirical analysis of organizational processes. Prerequisites: Senior standing and 8 hours of sociology, or consent of the instructor.
348. **Military Institutions in American Society. 4 hours.** Analysis of military institutions as components of the larger society; recruitment and socialization processes, behavior patterns in military organizations, paramilitary groups, and patriotic societies. Prerequisite: 12 hours of sociology or political science.
349. **Sociology of Occupations and Professions. 4 hours.** Theoretical and empirical analysis of the occupational structure and occupational mobility processes in American and other industrial societies; patterns of recruitment and retention in occupations and professions. Prerequisite: Soc. 263 or consent of the instructor.
351. **Medical Sociology. 4 hours.** Sociological contributions to medicine and public health; social organization and the organization of health services; the sociology of illness. Prerequisites: Senior standing and 8 hours of sociology.
361. **Social Gerontology: Old People in America. 4 hours.** The aged: demographic trends, economic status, physical and social needs, family relationships. Prerequisites: Senior standing and 8 hours of sociology.
365. **The Sociology of Politics. 4 hours.** Sociological interpretation of leadership, citizen participation, and the development of political organizations, using comparative materials from the United States and other countries. Prerequisite: 12 hours of sociology or consent of the instructor.
366. **Community Power Structure. 4 hours.** Analysis of the power structure of American communities; special emphasis on the relation between theoretical assumptions and research procedures in current community studies. Prerequisite: 12 hours of sociology or consent of the instructor.
371. **Population I. 4 hours.** Primarily for sociology majors and graduate students. The measurement and study of major trends and differentials in fertility, mortality, population growth, and age-sex composition in the United States and other countries. Emphasis on social and cultural determinants and consequences. Prerequisite: 12 hours of sociology, including Soc. 185, or the equivalent.

372. **Population II. 4 hours.** The measurement and study of major trends in migration, population composition, marriage and divorce in the United States and other countries; theories and policies regarding population growth in relation to resources; population forecasting. Prerequisite: Soc. 371.
373. **Human Ecology. 4 hours.** The relationship between man and the natural environment. Emphasis on the importance of population patterns and human institutions in adaptation. Prerequisite: 12 hours of sociology, including Soc. 185 or the equivalent, or consent of the instructor.
376. **Urban Sociology. 4 hours.** Review and analysis of recent research on urban areas, including their social organization, culture and subcultures, institutions, and contemporary problems. Prerequisites: Soc. 263 and 276.
385. **History of Sociological Theory. 4 hours.** The major theoretical systems that have developed in the field, beginning with the foundations in philosophical and scientific thought before Comte and proceeding to some of the contemporary representatives in the field. Prerequisite: Soc. 263 or 8 hours of sociology.
389. **Independent Study. 2 to 12 hours.** Supervised study projects for graduate students and honors undergraduates; may consist of extensive readings in specialized areas of sociology or empirical research. Prerequisites: Soc. 263, 20 hours of sociology, and approval of the department.
390. **Strategies of Research Design and Analysis. 4 hours.** The nature of sociological research; formulation of researchable problems; alternative research designs and procedures of data collection and analysis. Prerequisite: Soc. 263 or graduate standing.

## SPANISH (Span)

Asterisks (\*) indicate general education credit in humanities.

101. **Elementary Spanish. 4 hours.** Two additional half hours per week in the language laboratory. For students without credit in Spanish. Oral practice, reading, and grammar. **W, S, Su, F**
102. **Elementary Spanish. 4 hours.** Two additional half hours per week in the language laboratory. Continues Spanish 101. Prerequisite: Span. 101 or the equivalent. **W, S, Su, F**
103. **Elementary Spanish. 4 hours.** Two additional half hours per week in the language laboratory. Continues Spanish 102. Prerequisite: Span. 102 or the equivalent. **W, S, Su, F**

104. **Intermediate Spanish. 4 hours.** Two additional half hours per week in the language laboratory. Rapid reading, grammar review, composition, conversation. Prerequisite: Span. 103 or two years of high school Spanish. W, S, Su, F
105. **Intermediate Spanish. 4 hours.** Continues Spanish 104. Prerequisite: Span. 104 or the equivalent. W, S, Su, F
106. **Intermediate Spanish. 4 hours.** Continues Spanish 105. Prerequisite: Span. 105 or the equivalent. W, S, Su, F
115. **Elementary Composition and Conversation. 2 hours.** Difficulty level: Spanish 104 through 106. May be taken concurrently with Spanish 105 or 106. Does not count toward the major in Spanish. Prerequisite: Span. 104 or two years of high school Spanish.
- \*185. **Masterpieces of Spanish Literature in English Translation. 4 hours.** Not open to Spanish majors. Satisfies general education requirement in humanities when taken in sequence with French 185 and German 185. F
211. **Intermediate Composition and Conversation. 3 hours.** Prerequisite: Span. 106 or four years of high school Spanish. W, S, Su, F
212. **Intermediate Composition and Conversation. 3 hours.** Continues Spanish 211. Prerequisite: Span. 211 or the equivalent. W, S, F
213. **Intermediate Composition and Conversation. 3 hours.** Continues Spanish 212. Prerequisite: Span. 212 or the equivalent. W, S, F
214. **Advanced Composition and Conversation. 3 hours.** Prerequisite: Span. 213 or the equivalent. Su, W, S, F
215. **Advanced Composition and Conversation. 3 hours.** Continues Spanish 214. Prerequisite: Span. 214 or the equivalent. W, S, F
216. **Advanced Composition and Conversation. 3 hours.** Continues Spanish 215. Prerequisite: Span. 215 or the equivalent. W, S, F
217. **Spoken Spanish. 3 hours.** Intensive course. Exclusively oral-aural. Prerequisite: Span. 213 or the equivalent.
- \*218. **Spanish Literature to 1700. 3 hours.** Highlights of Spanish literature from its beginning through the seventeenth century. Prerequisite: Span. 106 or the equivalent. Su, S, F
- \*219. **Spanish Literature to 1900. 3 hours.** Continues Spanish 218. Prerequisite: Span. 218. W



- \*221. Spanish Literature of the Twentieth Century. 3 hours.** Continues Spanish 219. Highlights of the twentieth century. Prerequisite: Span. 106 or the equivalent. **F, W, S, Su**
- \*222. Introduction to Spanish Literature and Criticism. 3 hours.** An introduction to critical techniques in various literary genres and an historical perspective to the previous three-term introductory survey of Spanish literature. Prerequisites: Span. 219 and 221.
- \*223. Spanish-American Fiction of the Twentieth Century. 3 hours.** Readings in contemporary Spanish-American novelists and short story writers. Prerequisite: Span. 106 or four years of high school Spanish. **F, S, W,**
- \*224. Spanish-American Fiction of the Twentieth Century. 3 hours.** Continues Spanish 223. Prerequisite: Span. 223. **W, F, S**
- 231. Commercial Spanish. 3 hours.** A general course in the use of Spanish in commercial correspondence and in other areas of the business world: business-letter writing, orders, invoices, banking, standard abbreviations. Prerequisite: Span. 106 or four years of high school Spanish.
- \*240. Spanish Literature in Translation. 3 hours.** Not open to majors or minors in Spanish nor to anyone with credit in Spanish courses above the 200 level. The major works from the *Cid* to the end of the nineteenth century. Prerequisite: Sophomore standing or consent of the instructor. **F**
- \*241. Spanish Literature in Translation. 3 hours.** Not open to Spanish majors or minors nor to anyone with credit in Spanish courses above the 200 level. Major works from 1898 to the present. Prerequisite: Sophomore standing or consent of the instructor. **W**
- \*242. Spanish-American Literature in Translation. 3 hours.** Not open to Spanish majors or minors nor to anyone with credit in Spanish courses above the 200 level. Major works from the beginning of Spanish-American literature to the present; emphasis on the nineteenth and particularly the twentieth century. Prerequisite: Sophomore standing or consent of the instructor. **S**
- 280. Teachers Course. 3 hours.** A survey of resources, classroom materials, standard practices, instruction and practice in the audiovisual and language laboratory techniques; problems in the teaching of Spanish. Practical application to actual classroom situations. Prerequisites: Span. 211, 212, and 213; or 221 and 222; or 223 and 224. **W, F**
- 281. Teachers Course. 3 hours.** Continues Spanish 280. Prerequisite: Span. 280. **S**
- 291. Senior Thesis. 2 hours.** May be repeated for a maximum of 6 hours. For candidates for honors in Spanish. Prerequisite: Honors status.

299. **Independent Study. 1 to 6 hours.** Open only to Spanish majors. Prerequisite: Consent of the instructor. **W, S, F, Su**
303. **Nineteenth Century Spanish Non-Romantic Drama. 3 hours.** Representative outlines of non-romantic plays, their characteristics and development. Prerequisites: Span. 218 and 219 or 221 and 222.
305. **Romanticism and Realism in Nineteenth Century Spanish Literature. 3 hours.** Representative works and genres; particular emphasis on the romantic drama and the realistic novel. Prerequisites: Span. 218 and 219, or 221 and 222, or the equivalents.
306. **Romanticism and Realism in Nineteenth Century Spanish Literature. 4 hours.** Continues Spanish 305. Prerequisite: Span. 305.
307. **The Generation of 1898. 4 hours.** Representative works of Baroja, Azorin, Unamuno, Maeztu, Valle Inclan, Benavente, A. Machado, and others. Prerequisites: Span. 218 and 219, or 221 and 222. **S**
308. **Spanish-American Literature to 1888. 3 hours.** The development of Spanish-American literature from the sixteenth century through the end of the Romantic period. Prerequisite: Span. 224 or the equivalent. **S**
309. **Spanish-American Literature to 1888. 3 hours.** Continues Spanish 308. Prerequisite: Span. 308. **F**
310. **Modernismo and Contemporary Spanish-American Poetry. 4 hours.** From 1888 to the present; some Modernista prose. Prerequisite: Span. 244 or the equivalent.
311. **Modernismo and Contemporary Spanish-American Poetry. 3 hours.** Continues Spanish 310. Prerequisite: Span. 310. **W**
314. **Drama and Poetry of the Golden Age. 3 hours.** The romances and the chief poets of the sixteenth century. Prerequisite: Span. 218 or the equivalent.
315. **Drama and Poetry of the Golden Age. 3 hours.** Continues Spanish 314. Prerequisite: Span. 314.
317. **Prose of the Golden Age. 4 hours.** Major examples of picaresque, pastoral and chivalric forms. Prerequisite: Span. 218.
320. **The Contemporary Spanish Novel. 4 hours.** Development since 1936. Prerequisites: Span. 218 and 219, or 221 and 222, or the equivalents.
321. **The Contemporary Spanish Novel. 4 hours.** Continues Spanish 320. Prerequisite: Span. 320. **W**

323. **The Contemporary Spanish-American Novel I.** 4 hours. From the Romantic period to 1930. Prerequisite: Span. 224 or the equivalent.
324. **The Contemporary Spanish-American Novel II.** 4 hours. Continues Spanish 323. From 1930 to the present. Prerequisite: Span. 323.
331. **La Cultura Hispanica: Espana.** 3 hours. A consideration of the cultural aspects of Spanish civilization. Prerequisite: Span. 218 or 221 or 223, or the equivalent. **S**
332. **La Cultura Hispanica: Hispanoamerica.** 3 hours. A consideration of cultural aspects of Spanish-American civilization. Prerequisite: Span. 218 or 221 or 223, or the equivalent. **F**
340. **History of the Spanish Language.** 3 hours. A general survey of the development of the Spanish language. Prerequisites: Span. 213 and 218 or the equivalents.
342. **Introduction to Romance Philosophy.** 3 hours. History of the Romance Languages, especially Spanish, French, Italian, and Portuguese, from the Classical Latin period to the present, including their external history, phonology, morphology, and syntax. Prerequisites: Span. 218 and 2 years of college-level French or consent of the instructor.
345. **Medieval Spanish Literature.** 3 hours. The important works from the beginnings to 1400. Prerequisite: Span. 218. Span. 340 is recommended.
346. **Medieval Spanish Literature.** 3 hours. The important works of the fifteenth century. Prerequisite: Span. 218. Span. 340 is recommended.
349. **Phonetics.** 4 hours. Prerequisites: Span. 213, and 218 or 221.
352. **Syntax.** 2 hours. Prerequisites: Span. 213 and 218 or 221, or the equivalents. **W, F**
353. **Syntax.** 2 hours. Continues Spanish 352. Prerequisite: Span. 352. **S**
371. **Spanish for Teachers.** 3 hours. A consideration of those language problems suggested by teaching experience. It is recommended that this course be taken after student teaching, in the last quarter before graduation. Also open to experienced teachers. Prerequisite: 30 quarter hours of Spanish above the 100-level.

## SPEECH AND THEATRE (Spch)

One asterisk (\*) indicates general education credit in humanities.

Two asterisks (\*\*) indicate general education credit in social sciences.

100. **Principles of Effective Speaking. 3 hours.** Students must register for a lecture and a recitation section. Analysis of contemporary speechmaking theory with emphasis on message selection, analysis, structuring, and support; audience analysis and adaptation; language; and examination of principles of delivery. **F, W, S, Su**
101. **Effective Speaking. 2 hours.** Application of the principles of effective speech-making. Practice in the preparation and presentation of short speeches. Prerequisite: Spch. 100 or consent of the instructor. **F, W, S, Su**
102. **Principles of Effective Speaking. 4 hours.** Prerequisite: James Scholar or Dean's List status or speech major or consent of the department.
107. **Parliamentary Procedure. 2 hours.** Principles and practice. **F, W, S, Su**
- \*\*111. **Foundation of Communication Theory. 4 hours.** The development of communication theory from Plato and Aristotle to the twentieth century. Consideration of concepts, including relationships between societal needs and communication theory, free speech, development of parliamentary institutions, and fundamental communication principles. **F, W, S**
- \*\*112. **Interpersonal Communication Theory. 4 hours.** Study of cognitive, linguistic, and physical processes in communication. Communication models, cognitive dissonance, language behavior, feedback and channels. **F, W, S**
- \*\*113. **Mass Communications Theory. 4 hours.** The nature of mass communications, with particular consideration of major concepts, including communication technology and societal change, information transmission and diffusion, content analysis and the measurement of effects, the institutionalization of mass communications, freedom and responsibility in public and private channels, and the relationship of mass communications to mass culture. **W, S**
- \*121. **Introduction to the Theatre. 4 hours.** The nature and elements of theatre—the theories, styles, and semantics of theatre arts. **F, W, S, Su**
- \*122. **Survey of Theatre History. 4 hours.** An introduction to the major historical periods of the development of the theatre and drama from ancient Greece to the present. Prerequisite: Spch. 121. **W, S**
- \*123. **Contemporary Theatre. 4 hours.** Critical and analytical study of current theatre productions based upon modern literary, production, and perform-

ance standards. Students will attend and analyze several currently produced plays in the Chicago area. Prerequisite: Spch. 121. **F, W, S**

131. **Survey of Contemporary Broadcasting. 4 hours.** Introduction to the history, structure, operation and impact of American broadcasting and its relation to other media and institutions in our society.
141. **Oral Interpretation of Literature. 4 hours.** Oral reading for understanding, appreciation, and communication. **F, W, S, Su**
151. **Introduction to Technical Theatre. 4 hours.** A lecture-laboratory approach to the basic techniques of play production. Survey of historical background and sources, theories, styles, methods and materials of scene design, stage lighting, costuming, and makeup. Lectures, readings, and practical problems. Prerequisite: Spch. 121. **F**
171. **Principles of Speech Development and Correction. 4 hours.** An introductory course that considers the development, role, and structure of language. Designed to assist the teacher in identifying and recognizing the child handicapped in speech and language. Discussion of the nature, causes, and therapeutic methods for such handicaps. Clinical observations. **F, S**
180. **Speech Variation in Urban Areas. 4 hours.** The development, causes, roles, and structure of urban speech variation; emphasis on Black English. A lecture-laboratory approach to the aspects of multi-dialectal behavior; theories, styles, conflicts. Systematic examination of, and practice in, cross-cultural speech.
195. **Advanced Voice Training. 3 hours.** Designed to develop in the individual student's voice a wide range of control in pitch, volume, and quality to meet extraordinary voice and speech demands in broadcasting, interpretation, public address, teaching, and theatre. Prerequisite: Voice proficiency test, to be administered by the instructor. **W**
201. **Bases of Speech. 4 hours.** The social, physical, physiological, neurological, phonetic, linguistic, psychological, genetic, and semantic bases of speech. **W**
202. **Fundamentals of Phonetics. 4 hours.** Phonemics and phonetics; emphasis on pronunciation characteristics of American English, ear training, and practice in transcription. **F, S**
203. **Anatomy and Physiology of the Speech Mechanism. 4 hours.** Anatomical and physiological characteristics of the normal speech-and-hearing mechanisms; physiology of speech production. Prerequisite: Spch. 201 or 202 or consent of the instructor.
204. **Speech Science. 4 hours.** Voice and speech as related to the physiology of



the speech act, acoustics, and the hearing of speech. Prerequisite: Spch. 201 or 202 or consent of the instructor.

- 210. Statistics in Communication Research. 4 hours.** Credit is not given for Speech and Theatre 210 if the student has credit in Quantitative Methods 171 or Sociology 185 or Geography 185 or Psychology 243. The role of statistics in communication research; the nature of research design; the basic concepts of measurement scales, distributions, parameters, hypothesis testing; methods of assessing differences; methods of assessing relationships. Examples will be drawn from communications research. Prerequisites: Spch. 112 and 113 or consent of the instructor.
- 211. Discussion. 4 hours.** Study and practice in the theories and techniques of group discussion; the nature of small-group decisionmaking; discussion as a learning technique. Prerequisite: Spch. 112. **S**
- 212. Argumentation. 4 hours.** The theory of argumentation; evidence, reasoning, and refutation; historical and contemporary debates and argumentative discourse; practice in argumentative speaking. **F**
- 213. Persuasion. 4 hours.** Principles of attitude change, including theories of persuasion and audience analysis. Practice and experimentation in persuasive speaking. Prerequisites: Spch. 111, 112, and 113; or 215; or consent of the instructor. **W, Su**
- 215. Psychology of Attitude and Opinion. 5 hours.** Same as Psychology 215. Survey of behavioral approaches to the measurement of social attitudes and opinions; determinants and correlates of public attitudes and opinions. Lecture and participation in field and laboratory studies. Prerequisite: 8 hours of psychology or consent of the instructor for well-qualified speech majors. **F**
- 231. Television and Radio Performance. 4 hours.** Development of the basic skills for effective dramatic and nondramatic television and radio performance; announcing, interviewing, and acting. Special attention is given to individual performance problems. Lecture and laboratory. Prerequisites: Spch. 113 and 131 or consent of the instructor. **F**
- 232. Television and Radio Production. 4 hours.** Lecture and laboratory course designed to teach advanced production techniques for radio and television. Students are exposed to a variety of radio and television production situations. Prerequisite: Spch. 131 or consent of the instructor. **W**
- 233. Television and Radio Directing. 4 hours.** Designed to develop style and skill in television and radio directing, with special attention to script analysis, staging, pictorial composition, audio placement and integration, control room operation, crew management, and rehearsal procedures. Prerequisite: Spch. 232. **S**

239. **Mass Communication Practicum.** 5 hours. Professional studies in the mass media. Students work in Chicago-area radio and television stations. The nature of work is determined in consultation with the department and the station involved. Limited to a few advanced students in mass communications on the basis of written applications submitted one quarter in advance. Prerequisite: Approval of the head of the department.
241. **Advanced Oral Interpretation.** 4 hours. Literary analysis of poetry, prose, and drama; platform presentation of literary materials. Prerequisite: Spch. 141. **W, S, Su**
251. **Advanced Technical Theatre.** 4 hours. Advanced techniques of play production. Fundamentals of scene design, lighting, and costuming, such as illusion techniques, ornamentation, use of color, and techniques of rendering, plotting, and sketching. Practical work with University Theatre. Prerequisite: Spch. 151. **W**
261. **Fundamentals of Acting.** 4 hours. Methods of acting, with emphasis on basic stage techniques and the role of the character in relation to the intellectual and emotional values of the play. Prerequisites: Spch. 121 and 141 or consent of the instructor. **F**
262. **Advanced Acting.** 4 hours. Study and practice of modern realistic and nonrealistic acting techniques. Development and performance of a full-length characterization. Prerequisite: Spch. 261 or consent of the instructor. **W**
264. **Fundamentals of Stage Directing.** 4 hours. Principles and techniques of the director's art. Fundamentals of staging: blocking, movement, business, tempo; script analysis and rehearsal planning. Specific projects in directing scenes. Prerequisites: Spch. 121 and 261.
265. **Advanced Stage Direction.** 4 hours. Procedures for developing a creative relationship between director and actor in interpreting a play in rehearsal; historical consideration of directional methods. Class analysis of problems of interpretation and stage management; assignment of scenes to demonstrate dramatic values. Prerequisite: Spch. 264. **S**
295. **Secondary School Speech Curriculum.** 4 hours. Designed to equip the prospective speech teacher with the objectives, principles, and methods of teaching speech arts in the secondary school. Prerequisites: Junior standing and 16 hours of speech courses.
298. **Honors Course: Individual Study.** 3 hours. May be repeated for a maximum of 6 hours. Individual study leading to a thesis to complete requirements for distinction in the Department of Speech and Theatre. Prerequisites: 4.000 grade-point average, 24 hours of speech and theatre, and consent of the head of the department. **F, W, S**

- 299. Individual Topics. 3 hours.** May be repeated for a maximum of 6 hours. Individual investigation of special problems. Prerequisites: 10 hours of speech, 3.750 grade-point average, and consent of the head of the department. **F, W, S**
- 301. Communication Analysis. 4 hours.** Descriptions, models, proposed dimensions, and statistical treatment of the communication process. Prerequisites: Spch. 112, 113, 201 or 202, and 210, or consent of the instructor.
- 302. Group Communication Theory. 4 hours.** Detailed analysis and observation of group processes from the viewpoint of modern information and field communication theory. Prerequisites: Spch. 111, 112, 113, 210 and 211, or consent of the instructor.
- 303. Theories of Language Performance. 4 hours.** Contemporary theories and related research in language performance, centering upon selected approaches to language acquisition and behavior; special emphasis on the psycholinguistic approach. Prerequisites: Spch. 112, 201, or 202, 210 or the equivalent; or sufficient language-linguistics background.
- 311. American and British Public Address I. 4 hours.** A critical and historical study of American and British speakers and their speeches to 1850. Prerequisites: Spch. 111, 112, 113 and any two of Spch. 211, 212, or 213; or consent of the instructor.
- 312. American and British Public Address II. 4 hours.** Continues Speech and Theatre 311; from 1850 to 1920. Prerequisites: Spch. 111, 112, 113 and any two of Spch. 211, 212, or 213; or consent of the instructor. **F**
- 313. Contemporary Public Address. 4 hours.** Speechmaking, with the principal focus on issues relating to economics and government, World War II, postwar international problems, and civil rights. Prerequisites: Spch. 111, 112, 113 and any two of Spch. 211, 212, or 213; or consent of the instructor. **W**
- 315. The Rhetoric of Free Speech. 4 hours.** The rhetorical processes employed by those speakers in the British House of Commons and in America who participated in the freedom of speech movements. Consideration is given to issues relating to the contemporary American scene. Prerequisites: Spch. 212 and PolS. 355, or consent of the instructor.
- 317. Social Psychology of Theatre. 4 hours.** Same as Sociology 317. Compares social psychological theories which are explicitly dramaturgical and theories of drama which are explicitly social. Considers dramatic works as social psychological events. Prerequisite: Soc. 130 or Psch. 115 or consent of the instructor.
- 321. European Theatre History I. 4 hours.** Historical survey of the theatre and theatre arts of ancient Greece, Rome, medieval Europe, the Italian

Renaissance, and Elizabethan England. Prerequisites: Spch. 122 and at least eight hours credit from Spch. 241, 251, 261, 262, 264, and 265. **W**

- 322. European Theatre History II. 4 hours.** Historical survey of the theatre and theatre arts from the seventeenth century to modern times in Europe and England. Prerequisites: Spch. 122 and at least 8 hours credit from Spch. 241, 251, 261, 262, 264, and 265. **S**
- 324. American Theatre History I. 4 hours.** Development of the American theatre from 1700 to 1914; historical trends and dramatic literature. Prerequisites: Spch. 122 and at least 8 hours credit from Spch. 241, 261, 262, and 264, or consent of the instructor.
- 325. American Theatre History II. 4 hours.** Development of the American theatre from 1914 to the present; native and European influences in determining theatrical trends. Prerequisites: Spch. 122 and at least 8 hours credit from Spch. 241, 261, 262, and 264, or consent of the instructor. **F, Su**
- 327. Playwriting. 4 hours.** An introductory course in the writing of drama as a distinctive mode of expression intended for theatrical performance. Study of the nature of the theatrical experience and dramatic action through the basic elements of plot, character, theme, dialogue, mood, and spectacle. Specific writing exercises and satisfactory completion of an original one-act play. Prerequisites: Junior standing and Spch. 122 and 123 or consent of the instructor.
- 328. Play Production Prospectus. 4 hours.** Seminar emphasizing the stage director's central function in creating an artistic concept for producing a play and coordinating all elements of performance in aesthetic unity. Historical research of a recognized dramatic classic and preparation of a complete production book. Prerequisites: Spch. 251, 264, and 265, or consent of the instructor.
- 329. Theatrical Criticism. 4 hours.** Seminar in the study and practice of theatrical criticism, principally modern and contemporary criticism. Historical bases of critical judgment of play and performance; function and influence of the critic in establishing artistic standards and cultivating public taste. Preparation of criticisms of current productions. Prerequisites: Spch. 122, 123, 261 and 264, or consent of the instructor. **W**
- 331. Mass Media Programming. 4 hours.** Mass media program types, objectives, methods, and effects; creative development of programs from conception to script. Prerequisites: Two courses in speech including Spch. 232. **F**
- 332. Projects and Problems in Mass Media. 4 hours.** Each student plans and executes an individual project of substantial dimensions in television, radio, motion pictures, magazines, or newspapers. The project culminates in a research paper. **W**



333. **Mass Communications Seminar. 4 hours.** Intensive study of the nature of mass media in contemporary society. The legal and social responsibilities of mass media institutions in the United States and abroad. Prerequisites: Two courses in speech including Spch. 231.
351. **Scene Design and Lighting. 4 hours.** A lecture-laboratory approach to the role stage lighting plays in scene design. Analysis of historical background and sources; special emphasis on such areas as theories, psychological and aesthetic factors, and lighting application techniques and equipment. Lectures, readings, and practical problems. Prerequisite: Spch. 251 or consent of the instructor.
361. **Periods and Styles of Acting. 4 hours.** Concentration on premodern styles of acting from these periods: classic Greece, *commedia dell' arte*, Elizabethan, Restoration and the eighteenth century, nineteenth century melodrama, and naturalism. Prerequisites: Spch. 261 and 262 or consent of the instructor. S
371. **Advanced Study in Language. No credit.** Intensive study of the language and speech activities of elementary school children; particular attention to those children labeled language disabled. Includes the study of language acquisition and applicable speech activities. Prerequisite: Baccalaureate degree from an accredited institution.
397. **Proseminar in Speech and Theatre. 4 hours.** Examination of research trends and methodologies appropriate to the area. Prerequisites: Graduate standing and 30 hours in speech and theatre.

## **SPEECH FOR FOREIGN STUDENTS (SpchF)**

103. **Speech for Foreign Students. No credit.** Sounds and intonation patterns of American English; relation of sound to spelling. Drill sessions designed to improve the student's ability to speak and understand English at normal conversational speed. Prerequisites: Reading knowledge of English; ability to understand instructions.
104. **Speech for Foreign Students. No credit.** English pronunciation for students whose native language is not English. Sounds and intonation patterns of American English; designed to improve the student's ability to speak at a normal conversational pace. Pronunciation material similar to that in Speech for Foreign Students 103 but for more advanced students. Prerequisite: SpchF. 103 or consent of the instructor.



## STUDENT COUNSELING SERVICE (SCS)

101. **Reading Improvement. No credit.** For students who wish to increase their reading rate or improve their vocabulary and comprehension skills.
102. **Study Skills Improvement. No credit.** For students who need to develop more effective study methods. Through discussion and group interaction, students are helped to clarify their purposes and goals and to improve concentration and study skills.
103. **Vocabulary Development. No credit.** For students who need assistance in developing language skills. Use of vocabulary in thinking and communication. Practical exercises in vocabulary building.
104. **Career Planning. No credit.** For students who wish to clarify their vocational goals. Self-evaluation of abilities, interests, and personal needs as they bear on occupational choice.
105. **Group Dynamics. 0 hours.** Group sessions for students who wish to develop greater awareness of themselves and their relationships with others and to become more sensitive to nonverbal forms of communication. Groups oriented toward specific topics, such as leadership training, are offered if a sufficient number of students express interest.
180. **Reading and Study Skills Improvement. 0 hours.** Restricted to students enrolled in the Educational Assistance Program in Urban Education. Improvement of reading comprehension in relation to different types of content; understanding the processes of concentration, retention of ideas, memory, and distribution of practice. Intensive application of improved methods of reading and study; elimination of ineffective approaches. Prerequisite: Consent of the instructor.

## SYSTEMS ENGINEERING (SysE)

151. **Introduction to Engineering Design I. 4 hours.** Fundamentals of engineering design processes; engineering graphical problem solving and communications; data presentation and analysis; vector analysis; technical reports; standards and conventions; spatial geometry; short creative problems and creative design projects. Prerequisites: Registration in Math. 130 and Rhet. 101, or consent of the instructor.
152. **Introduction to Engineering Design II. 4 hours.** Continues Systems Engineering 151. Design applications of engineering statics; resultants of force systems, vector algebra and graphical analysis of force system equilibria, moments, and centroids; case studies and design projects to develop creativity. Prerequisites: SysE. 151 and registration in Math. 131.

153. **Introduction to Engineering Design III. 4 hours.** Continues Systems Engineering 152. Practical applications of design strategies and modeling and analysis techniques to engineering systems design projects; introduction to a variety of fundamental analytic methods, such as optimization, probability and statistics, and simulation; consideration of the role of the professional engineer in society. Prerequisites: SysE. 152. Rhet. 102, and registration in Math. 132, or consent of the instructor.
221. **Graphical Calculations. 3 hours.** Graphics in space flight. Graphical analysis and computations with analytical proofs. Graphical mathematics, including graphical calculus. Graphics of empirical equations. Graphics in communications—technical charts and monographs. Conceptual and creative design and computer-related graphics. Prerequisites: SysE. 103 or the equivalent and registration in Math. 133.
222. **Surveying I. 4 hours.** Fundamental operations. Prerequisite: Math. 250.
223. **Surveying II. 4 hours.** Introduction to precise control surveys and route alignment; elements of aerial photogrammetry. Prerequisite: SysE. 222.
230. **Transportation Systems Analysis I. 3 hours.** Introduction to analysis of transportation as general process and as man-machine system; examination of relation of transportation to other (urban) systems and subsystems, and to patterns of human activity. Characterization of general and specific transport technologies, including hardware and control and operating strategies. Introduction to models of transportation systems and processes. Prerequisite: Math. 195.
240. **Urban Systems Analysis I. 3 hours.** Introduction to the analysis of static urban systems: studies of the physical components and subsystems of urban systems; discrete, network, and ubiquitous engineering subsystems, behavioral patterns and market transactions; public and private activity subsystems; introduction to integrated systems studies. The analysis of the environmental consequences of complex engineering systems. Prerequisite: Math. 195.
250. **Dynamic Systems Analysis. 4 hours.** Mathematical modeling of lumped physical elements. Vector matrix formulation of linear dynamic systems. Laplace transform. State variable representation of lumped nonlinear systems. Analog and digital simulation of system equations. Prerequisites: Math. 195, InfE. 210.
271. **Introduction to Industrial Engineering I. 4 hours.** Structure and theory of industrial organization. Information processing. Mathematical models of industrial processes. Process control and automation. Reliability models. Quality control. Prerequisites: Econ. 121, credit or registration in Math. 370.
272. **Introduction to Industrial Engineering II. 4 hours.** Microanalysis of industrial processes. Flowgraphs and scheduling techniques. System simulation

and game theory. Optimal decision in management. Decisionmaking under risk and uncertainty. Industrial planning and policy development. Prerequisite: SysE. 271.

311. **Introduction to Systems Analysis I. 4 hours.** Mathematical modeling of systems described by ordinary differential equations, including electrical, mechanical, economic, ecological, industrial, and others. Fundamental laws describing generalized system elements. Topological consequences of element interconnections and solutions for elementary topologies using computer methods. Prerequisites: Math. 195 and InfE. 210.
312. **Introduction to Systems Analysis II. 4 hours.** Continues Systems Engineering 311. Lagrange's method of deriving generalized system equations. Analysis of multi-loop topologies using vector matrix forms. Solution of the general linear system using Laplace transforms and computer techniques. Prerequisite: SysE. 311.
313. **Introduction to Systems Analysis III. 4 hours.** Continues Systems Engineering 312. Feedback, stability, and frequency characteristics of generalized linear systems. Matrix transfer function forms for interacting systems. Introduction to non-linear generalized systems. Prerequisite: SysE. 312.
321. **Distributed Systems Analysis. 4 hours.** Analysis of linear, one and two-dimensional distributed parameter systems arising in engineering, economics, industry, and transportation type systems. Equations of motion are derived from elementary differential models and analyzed using analytic and simulation techniques. Prerequisite: SysE. 311 or the equivalent.
322. **Distribution Parameter Systems II. 4 hours.** Continues Systems Engineering 321. Prerequisite: SysE. 321.
323. **Distributed Parameter Systems III. 4 hours.** Continues Systems Engineering 322. Prerequisite: SysE. 322.
325. **Nonlinear Systems Analysis. 4 hours.** Analysis of inherently and/or topologically nonlinear models arising in engineering, economic, and ecological systems. Energy methods are used to reduce topology to a state space model which is then analyzed using classical and computer aided techniques. Prerequisite: SysE. 313 or the equivalent.
326. **Discrete Systems Analysis. 4 hours.** Analysis of the equations of motion of physical system models using finite difference forms. Lumped linear and nonlinear systems are emphasized but, where applicable, method is extended to distributed systems. Prerequisite: SysE. 313 or the equivalent.
330. **Transportation Systems Analysis II. 3 hours.** Continuation of studies of transportation as a process and a system; detailed analyses of relation between

major engineering systems providing transportation and economic, social, political, and psychological aspects of human activities; studies of financial and institutional factors affecting transport investments; integration of subsystem models for comprehensive analytical studies. Prerequisites: SysE. 230 and credit or registration in Econ. 120.

- 331. Transportation Systems Engineering. 3 hours.** Examination of fundamental physical relationships governing the operation and design of transportation systems and their components; general and specific analyses of system performance characteristics as a function of component specifications and system design. Prerequisites: Junior standing and SysE. 330, MatE. 102, or Phys. 111, or consent of the instructor.
- 332. Transportation Systems Planning. 3 hours.** Philosophies, strategies, and specific analytical techniques for planning large transportation systems; analysis and critique of contemporary institutional structures and models used for transportation planning; general and specific methods of forecasting future needs, developing plans, and evaluating alternatives; application of various techniques to practical transportation planning problems. Prerequisites: SysE. 330 and credit or registration in SysE. 371.
- 350. Stochastic Processes. 4 hours.** Analysis of probabilistic systems; the theory of games and decisions; recurrent event models, markov processes, and queueing systems; digital computer simulation of stochastic processes; applications to specific engineering systems. Prerequisite: Math. 370.
- 355. Urban Systems Analysis II. 3 hours.** Introduction to the analysis of dynamic urban systems; urban process analysis; modeling of growth and development processes; studies of decentralized and centralized decisional systems; quantitative analysis techniques for modeling; evaluating the performance of existing and planned urban regional systems and components; analysis and evaluation of technologically based regional policies. Prerequisites: SysE. 240 and credit or registration in Econ. 120.
- 356. Urban Systems Planning. 3 hours.** Introduction to philosophies, theories, strategies and techniques of urban systems planning; studies of urban value systems and the development of operational planning objectives; planning information systems, data collection and analysis; predictive model development; plan design methods; analysis of resources allocation; plan testing and evaluation; application of specific techniques to laboratory problems. Prerequisites: SysE. 230 and 355, credit or registration in SysE. 371 and Econ. 121.
- 360. Traffic Flow and Control Systems. 3 hours.** Introduction to particulate flow systems; investigation of microscopic flow relations and their effect on macroscopic flow properties; generalized study of traffic control systems; integrated investigation of flow properties, control systems, and system safety characteristics; applications to highway and air traffic flow. Labora-



tory work in data collection, analysis and simulation studies. Prerequisites: Math. 195, 370, SysE. 331, and credit or registration in SysE. 350.

- 361. Transportation Systems Evaluation. 2 hours.** Strategies and techniques of transportation systems evaluation; discussion of public works, investment-decision processes, and the role of the engineer; economic, social, psychological, and political analysis of transportation plans; market studies and simulation techniques; cost-effectiveness studies and program budgeting systems. Prerequisites: SysE. 332 and 360 and credit or registration in Econ. 121.
- 371. Optimization Techniques I. 4 hours.** Linear programming models, simplex method, sensitivity analysis, transportation problems, duality. Nonlinear programming models, separable objective function, geometric programming, Kuhn-Tucker equations, quadratic programming. Prerequisites: Math. 195, 220, senior standing or consent of the instructor.
- 372. Optimization Techniques II. 4 hours.** Dynamic programming, optimal control theory, Bellman, Hamilton-Jacobi, and Euler-Lagrange equations, Pontryagin's maximum principle. Search techniques, golden mean and fibonacci search, gradient approach, stochastic approximation. Prerequisite: SysE. 371 or consent of the instructor.
- 380. Quantitative Methods in Urban Engineering. 3 hours.** Theory and application of fundamental statistical and mathematical techniques of measurement and data analysis for urban systems engineering; presentation and critical review of selected quantitative methods appropriate to identifying problems, establishing design standards, and evaluating the performance of urban engineering systems. Prerequisites: SysE. 356, Math. 195 and 370.
- 381. Projects in Urban Systems Engineering. 2 hours.** Analytical and experimental projects in urban systems engineering and planning. Prerequisite: SysE. 380 and credit or registration in SysE. 350.
- 391. Seminar. 1 to 4 hours.** Topics to be arranged. Prerequisite: Consent of the instructor.
- 392. Undergraduate Research. 2 to 4 hours.** Research under the close supervision of a faculty member. Prerequisite: Consent of instructor.
- 393. Special Problems. 2 to 4 hours.** Special problems and reading by arrangement with the faculty. Prerequisite: Consent of the instructor.



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